Professionalising the IT Industry: Towards the Creation of a Professional Association

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The completion of the Doctorate in Professional Studies completes a personal goal that I have carried ever since I first left university over 20 years ago.

Thank you all

Sean Brady

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Glossary

Term	Definition
3rd Party IT Services	Companies that provide knowledge and skill on Information Technology to other companies
CEPIS	Council of European Professional Informatics Societies. An umbrella group representing Computer Societies in Europe.
Computer Societies	Organisation representing IT practitioners, typically at country level.
Database	A computer format and mechanism for storing data
dot.com	A company that conducts most of its business on the internet
Enterprise Resource Planning	Enterprise Resource Planning systems (ERP's) integrate all data and processes of an organization into a unified system
Hardware	General term to describe the physical artefacts of technology. Typically hardware refers to the machines within the IT industry.
IBM	International Business Machines. A leading company in the IT Industry
Intel Server	Computer Servers based on the Intel processor from the Intel Corporation
Internet	The Internet is the worldwide, publicly accessible network of interconnected computer networks that transmit data by packet switching using the standard Internet Protocol (IP). It is a "network of networks" that consists of millions of smaller domestic, academic, business, and government networks, which together carry various information and services, such as electronic mail, online chat, file transfer, and the interlinked Web pages and other documents of the World Wide Web.
IT	Information Technology. Concerned with collecting, managing, storing and processing information
IT Practitioners	People performing roles and tasks involved with Information Technology.
Operating system	An operating system (OS) is a computer program that manages the hardware and software resources of a computer.
PBX	A Private Branch eXchange (also called PBX, Private Business eXchange or PABX for Private Automatic Branch eXchange) is a telephone exchange that serves a particular business or office, as opposed to one a common carrier or telephone company operates for many businesses or for the general public.

Professional Certification	Certification programmes offered by vendors aimed at certifying skills on their products
Software	Software enables a computer to perform tasks. It is constituted in programmes written in programming languages. There are multiple types of software each performing different functions, e.g. operating system, system software and user software.
Software Engineering	The design, development, documentation and maintenance of software by applying technologies and practices from computer science, project management, engineering, application domains, interface design, digital asset management and other fields.
Software Infrastructure	Computer programmes that provide the infrastructure for the IT environment
Supercomputer	Large very fast and powerful computer
Switches/Routers	Devices on a computer network to direct the flow of data from one location to another
Telecommunications	The technology involved in sending data over networks
Unix/Linux	Operating systems designed for computers
Wide Area Networks	A computer network that covers a broad area, typically long distances either within a country or between countries
Windows	Operating system developed by Microsoft Corporation aimed at personal computers
Workstation	Computers designed for use by one person at a time

Chapter 1 : Introduction

'I hold every man a debtor to his profession, from the which as men do of course seek to receive countenance and profit, so ought they of duty to endeavour themselves by way of amends, to be a help and an ornament thereunto' (Bacon 1860)

The sense of belonging to a profession is a powerful motivating factor for many people. It conjures up images of skills, career, ethics, standards, maturity and a sense of being in control of one's destiny.

While many people have the opportunity and good fortune to belong to a professional association, IT practitioners find this opportunity lacking. The absence of a strong professional organisation, I believe, is contributing to some of the issues we see in the IT industry today, e.g.

- There has been a substantial drop off in the number of student entrants into IT courses in Universities (Flynn 2002, El Akkad 2005) while at the same time the demand on the number of skilled IT professions is on the increase (Ryan 2005, Eglin 2005)
- There is a need for an over seeing role to ensure standards and to guide future skills in the profession. We are seeing increasing number of cases where IT projects are deemed as failures which are having a negative effect on the image of the profession (Crosbie 2005).

And from my own professional experience:

- Experienced people are leaving the profession, typically these are in their late 40's and 50's mainly driven out by cost pressures. In many cases, experience is under valued in favour of newer skills
- Many IT practitioners feel that their profession is under valued and not on-par with more established professions, e.g. accountants, engineers, teachers etc. For many people, they can't describe their role; they refer to a job within a company.
- The first generation of IT graduates is 'greying' and contrary to many similar professions, fewer IT Professionals (compared to other professions) would encourage their children to follow in their footsteps.

The background information above is contributing to a poor image of the IT Profession.

It is my contention that an IT profession on par with the established professions in society will go a long way in reversing the decline in those choosing IT as a career and help to elevate the current and expected future skills shortage in IT.

This project will develop a set of actions that will help raise the level of professionalism in IT which in turn will address some of the issues raised above.

To enable me to develop this professional model of IT, I will use input from Computer Societies in a number of countries across Europe. This diverse population will ensure that I will represent the views of people on a European level and hence develop a model of the IT profession that is far reaching and applicable to tens of thousands of IT professionals in Europe.

Aim of Project

The main aim of the project is to develop a set of guidelines that will enable the current IT profession to evolve into one that can take its place along side the established professions in society today.

At this stage of the research we will use a working definition of a profession as *'a vocation in which a professed knowledge of some department of learning or science is used in its application to the affairs of others or in the practice of an art founded upon it'* (Oxford English Dictionary).

This definition is endorsed by Carr-Saunders & Wilson (1964) who go on to further explain that *'special competence acquired as a result of prolonged and specialised training, is the chief distinguishing characteristic of the professions'* and that *'a profession can only be said to exist when there are bonds between practitioners, and these bonds can take but one shape – that of formal association'.*

By understanding the core elements of what constitutes a profession and learning from the workings of other professions, I will identify the differences and unique elements of the IT profession and what lessons can be learnt to help enhance the professional status of IT. The impact of the IT industry and the relationship with other professions will be taken into account in defining the professional model for IT.

The main beneficiaries of the research will be those organisation and institutions interested in growing and cultivating the IT profession. The beneficiaries of the research will be:

- Computer Societies

  There are many IT organisations working to represent the interest of IT professionals in each country. This research will help identify the differences between them and the elements of a professional body. It may well be that these organisations are the vehicle through which improvements can be made towards creating an IT profession.

- IT Industry

  Companies (e.g. IBM) which have a vested interest in attracting, recruiting, motivating and retaining IT staff. It is also of key interest to them that their staff are well qualified, professional and works in an ethical manner. The increased attractiveness of IT as a career will benefit them while the improved standing of the profession within the society will help grow their business

- Academic Institutions

  Academic Institutions play a key role in the development of the next generation of IT professionals and hence will benefit from any recommendations from this project that will improve the level of professionalism. These recommendations may be applicable to the designers of future IT educational material, structure and content.

- The State and Regulatory Bodies

  All professionals operate within the boundaries conferred on them by the state and regulatory bodies. Throughout this research recommendations may be identified that suggest changes to the relationship between the State and IT Professional organisations.

- IT Professionals

  Many of the changes required to improve the IT Profession come from the IT Professionals themselves. Its members must want to make the changes and be willing to take action to make the changes happen. How individual professionals act will have a big impact on the image of the profession as a whole.

While developing the research proposal, I have had informal conversations with a number of stakeholders:

- Colleagues and members of the IT profession. The general consensus was that the IT profession had grown very fast over the last 20 years and is probably now entering a maturing phase. There was a feeling that the timing is right now in defining the future shape of the profession.

- IT recruitment. The sharp decline in the number of IT students selecting IT as university courses is a concern for most societies. The apparent contradiction of skills shortages and lack of interest in IT needs to be addressed. It was felt that the unstructured nature of the profession coupled with poor image problems contributes to the decline of interest in IT. A strong professional body for IT would help address this.

- IBM Management

  Like the rest of the IT industry, IBM is facing the same challenges of recruiting, retaining and motivating IT staff. This project is in support of IBM's interest and other initiatives in this area.

- Council of European Professional Informatics Societies (CEPIS)

  CEPIS is an umbrella organisation representing Computer Societies in the majority of European counties. Following discussions with senior officers of this organisation they confirmed that they had identified the area of professionalism within the IT industry as one of their top focus areas. They were excited about my area of research and offered their endorsement when contacting the various Computer Societies.

In general, there was consensus regarding the aims of the project and its timing from the main interested stakeholders of this research.

Role as Worker / Researcher

In IBM I have gained tremendous experience working with IT professionals across Europe. My current role of directly managing 2000 IT people in almost every country in Europe gives me the credibility, authority and resources to carry out the scale of research proposed here.

In my role as Worker / Researcher, I bring a lot of value and experience to the project. The value added and influence on my research as a result of being a worker / researcher can be both from a personal perspective or work-related position.

From a personal perspective, I have been in the IT industry for 20 years and regard myself as a member of the first generation of IT graduates. I have demonstrated throughout my career a keen interest in the development of people's careers and the development of the IT profession.

From a work-related position, I have experienced the decline in interest in IT in terms of recruitment, motivating and retaining staff, while at the same time well aware of the shortage of IT skills in the market place.

Both of these perspectives are the driving force behind my motivation for this project.

I also need to be aware of my senior management position within IBM. As I progress my research, I need to be aware of my approach and the method of data collection from people and from Computer Societies. To help alleviate any potential impact from being an employee of IBM, I aim to get the research endorsed by an industry body, e.g. CEPIS.

Main Research Question

The main research questions that I will answer during this project are:

- *What are the elements that need to be added or changed to the existing workings of the IT profession to enable it to become a professional body?*
- *Why are these elements significant?*
- *How do we bridge the gap?*

With some subsidiary questions as listed below:

- What is the nature of professions and professionalism and its applicability to IT?
- What can we learn from other professions and apply to an IT profession?
- What are the challenges that need to be overcome to achieve this desired state of professionalism?

A working assumption in this research project is that it is not only desirable but also possible to develop IT into a professional organisation as defined by our working definition earlier. Throughout the research we may discover that one or both of these assumptions may not hold true.

The Soft Systems Methodology (SSM) selected as the underlying research method is ideally suitable to cater for situations such as these that may surface during my research. (Checkland 1981) describes that the objective of the methodology is *to enable changes that meet two criteria: Are they both desirable and feasible – systemically desirable and culturally feasible?*

Even if no changes can be agreed, then one possibility supported by SSM is that the implementation of the changes becomes the new 'problem' and the methodology comes full circle.

The research question will focus on understanding the core characteristics of a profession and applying this to the IT industry. The existing IT organisations will be examined to help understand their relative closeness to the desired characteristics of an IT profession and any differences will be discussed.

Research Method

While selecting the research approach for this project, it became clear quite quickly that the Soft Systems Methodology (SSM) (Checkland 1981) approach was most suited to the project. The appropriateness of SSM to the research proposal is discussed in the paragraphs below.

First the unstructured nature of the problem being addressed is supported by SSM (Checkland 1981)
'A problem relating to real-world manifestations of human activity systems is a condition characterised by a sense of mismatch, which eludes precise definition, between what is perceived to be actuality and what is perceived might become actuality'

SSM also takes a view of the whole problem rather then its constituent components and develops abstract models to compare against the real world. The analysis of the difference between the models and the real world lead to suggested changes and action plans

Von Bulow (1989) produced a good summary of the overall SSM process which touches on many of the attributes of the research problem we are tying to solve.
'SSM is a methodology that aims to bring about improvements in areas of social concern by activating in the people involved in the situation a learning cycle which is ideally never-ending. The learning takes place through the iterative process of using systems concepts to reflect upon and debate perceptions of the real world, taking action in the real world, and again reflecting on the happenings using system concepts. The reflection and debate is structured by a number of systematic models. These are conceived as holistic ideal types of certain aspects of the problem situation rather than as accounts of it. It is taken as given that no objective and complete account of a problem situation can be provided'

I particularly like von Bulow's never-ending view of the approach. For a profession to be successful and survive it needs to learn and adapt. This is particular true in the fast moving IT industry.

In summary, the SSM methodology provides a good structured approach to the problem being addressed. Its 'soft' approach is ideally suited to the human-centered problem being addressed in this research.

This project is structured around the four main activities of the SSM methodology. Each activity addresses a stage of the research proposal which enables the research meet its objective of improving the professionalism of the IT profession.

During each activity information from external sources will be use to enrich the activity of that particular stage and to facilitate the achievement of its objectives.

The 4 phases of the project are depicted in the following diagram.

Activity 1 (see Chapter 2) will focus on gaining a holistic understanding of the problem to be addressed. The main input to this activity will be an in-depth understanding of the IT marketplace.

Activity 2 (see Chapter 3) will focus on understanding professionalism and develop a model that will be used to help analysis the current IT profession. It will examine

research in professionalism in general as well as recent work on the development of the IT profession. The output of this activity will be a model of a professional organisation which will be used in Activity 3.

Activity 3 (see Chapter 4) The purpose of this phase is to compare and contrast the model developed in the previous activity with the real world situation. This comparison will be done mainly by means of a survey to the main IT professional organisations (Computer Societies) across Europe. This activity will also be used to validate that the model being developed is feasible and socially desirable and the outcome will be the differences between the model and reality.
IBM will also be used as a case study to help in this analysis (see Chapter 5).

Activity 4 (see Chapter 6) The final activity is to take the differences found in Activity 3 and to understand the impact on the key stakeholders and to develop a set of suggested actions to increase the level of professionalism within the IT profession.

These activities will be addressed later in the sections which follow in this document.

Document Structure

The structure of this document is as follows:

- Chapter 1: Introduction
  - The first chapter outlines the motivation for selecting the subject area of the project and discusses its main aims and objectives as well as its significant contribution to the IT Profession. The author's role as a worker researcher is discussed as well as the research method selected for the project.

- Chapter 2 : Problem Statement
  - This chapter tales a holistic view of the problem that is being addressed. It examines the supply and demand of IT skills in the market place and discusses the current and future shortage of skills. The IT market is examined to reveal the dominance of global companies who have created professional certification programs to support their products and offerings. These certification programs encourage a short term view of professionalism rather than a longer term value based profession.

- Chapter 3 : Professionalism
  - The third chapter takes a look at the area of professionalism. It examines professionalism in general as well as taking a specific look at the work done on professionalism in the IT industry. The chapter concludes with a model of professionalism developed for the IT industry.

- Chapter 4 : Assessment of Current IT Profession
  - Using the Professional Model developed in the previous chapter, this chapter examines the implementation of IT professionalism in the real world. It does this by conducting a survey of Computer Societies across Europe. The real world implementation is compared with the professional model and the key findings of the survey are presented. The core value of the IT Profession is also discussed in the chapter.

- Chapter 5 : Case Study – IBM
    - The author uses his role as worker/researcher to examine IBM as a case study. In the chapter IBM's implementation of professionalism is discussed and compared with the survey results from the Computer Societies. The IBM values are also discussed and compared with those returned in the survey.

      As IBM is a very large player in the IT market place and is present in almost all categories of the market, the case study is a real useful insight into a global company and can contribute to the strengthening of the IT profession in Europe.

- Chapter 6 : Stakeholder Impact
    - Based on the outcome of the survey of European Computer Societies we examine the main findings and discuss their implications on each of the main stakeholders. Throughout the chapter we suggest recommendations which will help strengthen the IT Profession in Europe. This area represents a significant contribution to the structure and workings of the IT profession and its outcome will contribute to the enhanced standing of the IT profession which in turn will make it a more attractive profession for students to join and professionals to stay in.

- Chapter 7 : Professional and Methodological Reflections
    - In the chapter we take a retrospective look at the project and reflect on the research method used and the impact the study has had on professional knowledge and practice.

- Chapter 8 : Summary & Conclusions
    - The final chapter summaries the main activities, findings and actions of the project and its contribution to the IT profession. It also suggests areas of future research to further enhance the strength of the IT profession in Europe.

Chapter 2 : Problem Statement

The initial stimulus for this project was the apparent contradictory situation of a growing market demand for IT skills while at the same time experiencing a sharp fall-off in the number of students selecting IT and computer studies in universities. The diverse trends in both these items led me to ask the question, 'why is this happening?', and a determination to do something about it to address the decline and to ensure the continued success of the IT sector.

There are many views as to the cause of the fall-off in students selecting IT as a career, many of them suggest things like the requirements for Maths and Science, others attribute it to the experience of the dot.com collapse, while some say that the association with computer games put students off the choice as a serious career direction.

While these opinions may be true and may contribute somewhat to the overall decline in students, many of them are being addressed by various programmes and initiatives. One observation to take from these views is that they generally don't originate from the IT profession itself; they are views of people looking at the profession from the outside.

In this project, I bring a perspective from within the IT profession and from a position of over 20 years experience working for one of the major players in the IT sector in Ireland and Europe and world-wide. My vast experience of managing and leading IT professionals in many countries and in many sectors of the industry leads me to the view that the items mentioned above all have an impact on the number of students selecting IT courses, but they don't address one of the core issues; that of the IT profession itself.

My contention is that the lack of a strong IT profession leads to a lack of clarity in direction for students and existing IT practitioners alike. Many IT practitioners lose direction mid-career and are threatened by changes in technology and cost pressures. It is an industry that is relatively new (compared to other professions) and the time is right now to examine the IT profession and take a checkpoint on its status and direction.

The time is right now because we are at a time when the graduates of the first IT courses (circa. 1980s) are coming to an age where their children are making choices for university courses and anecdotal evidence suggests that many of these parents would not recommend their children to follow their footsteps into the IT industry. Contrast this to other professions where we often see generations follow each other into the same career.

I believe this issue is attributable to the lack of clarity and definition of the IT profession. This project seeks to examine the IT profession and suggest improvements which will enable it to provide this clarity and definition and provide a stimulus for the growth in the IT Profession which in turn will encourage more people to enter the profession.

Supply and Demand of IT skills

In this section we examine the Supply and Demand aspects of IT skills in the market place.

The IT Services market in Ireland employees about 30,800 people and represents just under 2% of the total employed workforce[1]. This is slightly above the EU average and reflects the large number of multi-national IT companies located in Ireland.

Regarding the supply of skills side, the following table shows the dramatic drop-off in the number of students who accepted a place on a computer related course in a third level institute in Ireland over the last 5 years.

Computing Discipline	2000		2004		2005	
Certificate & Diploma	2288	13.7%	985	7.5%	833	6.3%
Bachelor Degrees	1809	8.7%	889	3.6%	995	4.0%
	4097		1874		1825	

Table 1 Enrollments on Computer Related Courses[2]

[1] Source: Information Society statistics (1997-2002), European Commission
[2] Source: Central Statistics Office,Ireland

Over the last 5 years we have seen a dramatic 55% reduction in the number of students who choose to select computing / IT as a career. The percentages indicated reflect the percentage of students taken computing courses as a percentage of the total students accepting courses in third level colleges.

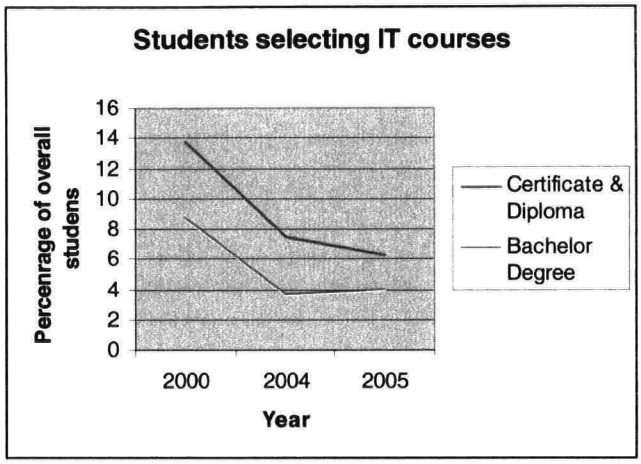


Figure 2 Enrollments on Computer Related Courses

On the skills demand side, the Expert Group on Future Skills Need (Forfas 2003) has predicted the future demand for IT skills as follows :

Demand	Computing Degree	Certificate & Diploma	Total
2005	2208	352	2560
2006	2424	383	2807
2007	2667	427	3094
2008	2945	472	3417
2009	3254	523	3777
2010	3612	579	4191

Table 2 Future Demand for IT Skills[3]

Graphically this can be display as shown below:

[3] Expert Group on Future Skills Needs (4th Report), Forfas 2003

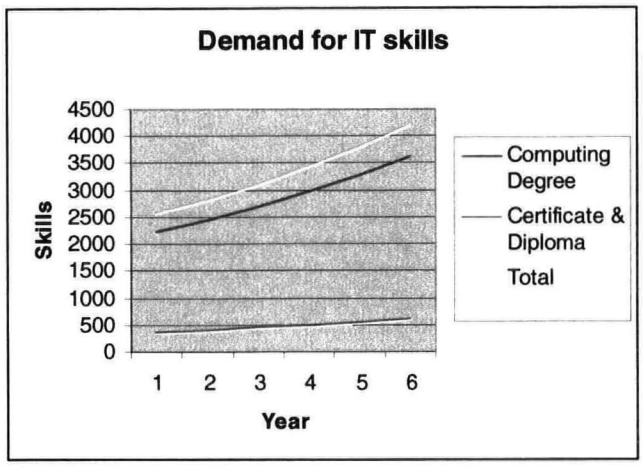


Figure 3 Future Demand for IT Skills

The computing demand table indicates that the supply of IT skills into the Irish market is not sufficient to meet the current demand and unless the student intake numbers change dramatically, the gap between supply and demand will increase dramatically.

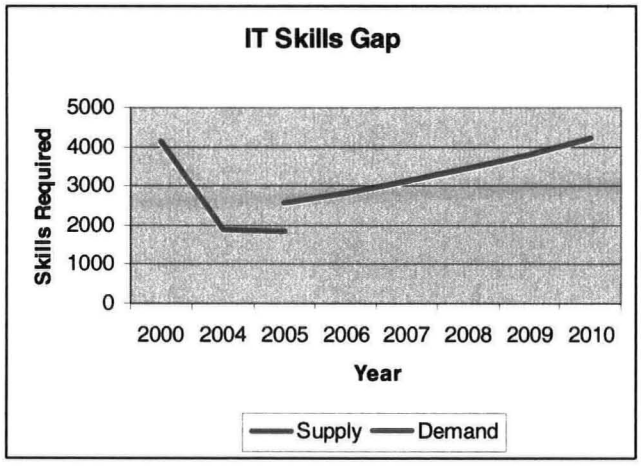


Figure 4 IT Skills Gap

An interesting point is the prediction of the split between the two levels of computing courses in the above tables is that the demand shortage is starker for Degree level candidates while the Certificate and Diploma level supply and demand shows an over supply trend. In my opinion this reflects the impact of globalisation on the IT market where lower level skills are being moved to off-shore locations while the demand for higher level skills is increasing dramatically.

The IT Skills shortage evident in Ireland is not unique, it is reflected in many others countries (see below) and therefore is a global problem that needs to addressed.

Western Europe Total IT Skills Shortage 2000-2005

	2000	2001	2002	2003	2004	2005
Demand	10,368,851	10,957,538	11,837,533	12,874,484	13,614,357	14,302,430
Supply	9,216,104	9,821,918	10,580,954	11,288,395	11,974,980	12,634,371
Shortage	1,152,747	1,135,620	1,256,579	1,586,089	1,639,377	1,668,058
%Shortage	11%	10%	11%	12%	12%	12%

Figure 5 Western Europe IT Skills Shortage 2000-2005[4]

The IT Market Place

To help understand the IT profession, it is necessary to examine the IT market place as this is the environment that the professions work within. The makeup and composition of the IT market place today has a huge impact on the meaning of an IT Professional. In this section we will see how the IT market place is dominated by a small number of global companies who both define the market and create a demand for skills. The global companies are so dominant that these companies define and set the standards for professionalism.

In this section we will analyse the IT market place and demonstrate the dominant position of a small number of companies.

The nature of the IT market place is that it is a continuously changing environment. New technologies are creating new markets and redefining old markets on a regular basis.

[4] Source: International Data Corporation, 2002

The IT Services market, where the majority of IT professionals work, is growing at an Annual Growth Rate of 6% and a market value of over $606m (Business Week 2004). Any analysis of the IT market place is at best a point in time analysis due to the constant changing scope.

In this section, we have gathered market information from a vast range of sources to develop a picture of the IT market place. The analysis is structured by major category and identifies the leading companies in each category.

To help segment the IT market we will use the percentage of spend (CRN 2005a) in each of the major categories and then look at what makes up that section of the market place.

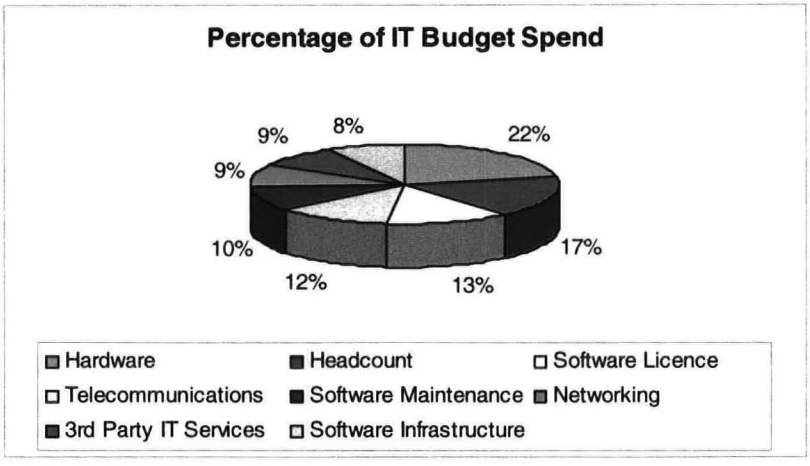


Figure 6 Percentage of IT Budget Spend

In the above diagram we can see the percentage of the overall IT budget spent on each category. In this section we will analyse the budget further to determine what makes up each of the major categories.

Since our interest is in understanding the IT profession and the impact of the market shape on defining the profession, we do not need then to analyse further the headcount spend (IT Staff) or the amount spent with Telecommunication companies for the purchase of networks (e.g. Wide Area Networks).

The composition of the remaining categories is shown in the following tables below. It is not the intention to describe in detail the various categories, but we will focus on some of the key messages apparent from this data.

Category	Sub-Categories		Market Share - Vendor
Hardware[5] 22%	Windows[6] 36.9%	Workstation[7]	Dell 40%
			HP 30%
			IBM 14%
			SUN 8%
			Fujitsu Siemens 3%
			Others 5%
		Intel Servers[8]	HP 35%
			IBM 20%
			Dell 19.2%
			Others 25.8%
	Unix 31.7%[9] Linux 11.5%		IBM 32.1%
			HP 28.7%
			SUN 12.6%
			Others 26.6%
	Others 19.9%	e.g. Supercomputers[10]	IBM 43.8%
			HP 33.8%
			Cray 3.6%
			SGI 3.6%
			Dell 3.4%
			Linux Network 3.2%
			NEC 1.2%
			Atipa Technology 1%
			Hitachi 1%
			Self made 1%
			Others 4.4%

Table 3 Computer Hardware Market

[5] CRN 2005a
[6] Network World 2005a
[7] Information Week 2005
[8] CRN 2005c
[9] CRN 2005b
[10] CRN 2005d

Category	Sub-Category	Market Share - Vendor
Software License 13%	Enterprise Resource Planning (ERP)[11]	SAP 40%
		Peoplesoft 12%
		Oracle 10%
		Sage Group 5%
		Microsoft Business Solutions 3%
		SSA Global 3%
		Geac 2%
		Intentia 2%
		Lawson Infor Global Solutions 2%
		Others 20%
Networking 9%	Switches, Routers[12]	Cisco 75%
		Juniper 16%
		Redback 1.5%
		Lucent 0.1%
		Others 7.4%
	PBX [13]	Avaya 17.6%
		Siemens 15.4%
		Nortel 11.7%
		Alcatel 8.1%
		Others 47.2%
Software Infrastructure 8%	Operating System[14]	Windows 59%
		Linux 33%
		Unix 5%
		Others 3%
	Database[15]	IBM 37%
		Microsoft 13%
		Others 50%

Table 4 Software, Networking and Infrastructure Market

[11] CRN 2005e
[12] Network World 2005b
[13] Network World 2005b
[14] Business Week 2005
[15] Network World 2003

Category	Sub-Category	Market Share - Vendor
3rd Party IT Services 9% [16]	Software 62%[17] Hardware 38%	IBM 27.5%
		EDS 14.9%
		Fujitsu (incl Amhdahl/DMR/ICL) 11.6%
		HP 8.8%
		Accenture 8.0%
		CSC 7.8%
		Cap Gemini Ernst & Young 6.5%
		Hitachi 5.1%
		ADP 4.8%
		First Data 4.8%

Table 5 3rd Party Services Market

Probably the most startling observation from this analysis is the fact that the market is defined and dominated by a small number of global companies.

The producers of technology (Hardware & Software) create the demand for IT Services (38% and 62% respectively). In essence the IT market is created by the global companies, they create the technology and provide a market for IT services to integrate and use their technology. Many companies (e.g. IBM, HP, Fujitsu, etc.) are dominant players in both sides of the market, the market creation via technology innovation and the IT Services consumer side.

This is a very interesting and unique aspect to the IT profession. In most other professions, the profession is defined by subject area knowledge rather then product knowledge e.g.

[16] VAR Business 2005
[17] CIO 2002

- Medicine : knowledge of anatomy, clinical and surgical procedures, causes and symptoms
- Teaching : knowledge of the curriculum and teaching methods
- Accounting: knowledge of accounting standards and processes

The fact that the IT market place is created by a relatively small number of global companies has an impact on the meaning of the IT profession. These companies have defined professionalism in terms of their product knowledge and have established de-facto professional standards in the industry. While there are certainly merits to this approach, there are also implications which can have negative impact on the IT Profession. The approach to professionalism as defined by the industry's major companies is described in the next section.

Professionalism in the IT Market Place

For the IT profession, the required skills and area of knowledge is defined by global companies rather than specific areas of information technology. This observation, I believe, is what makes the IT market unique and is one of the contributors to the position of the IT profession today.

The vendor created market can be demonstrated even further as we look at how these vendors are creating professional accreditations based solely on their products. The majority of the major IT vendors have created a professional qualification based on the knowledge and use of their products. There are many examples of professional certification by the main vendors and they generally have the following in common:

- The professional certifications are vendor created around their own product set. Vendors like IBM have hundreds of professional certification models to reflect its large product portfolio[18]. The vendors create the standard, provide the test material and recognize the certification.
- Many vendors have created a tiered or layered approach to certification, e.g.

[18] http://www-03.ibm.com/certify/

- Oracle: Certified Associated Professional, Certified Professional, Special Accreditation and Certified Master[19]
- Cisco: Associated, Professional and Expert levels[20]
- HP: Accredited and Master Accredited levels[21]

These levels of professionalism create a career path for people in this product area.

- The certification level provides the holder with a range of 'letters' and logos after their name which are well recognized in the IT market
- Vendors create certification to ensure that the required quality of skill is available to install and use their product. It is in the vendor's interest that as many people as possible are certified to the product level.
- Customers recognize the certification levels as an industry standard and a guarantee of the skills level of IT staff to perform the necessary work.
- The demand for certification level by potential employers is growing and for many parts of the IT industry is essential in order to gain employment, the most notable is in the network area, where a Cisco qualification is practically required to work on its equipment.

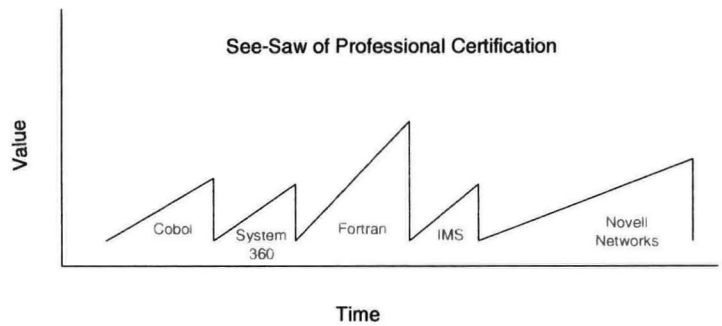
The growth in professional level certification by vendors in the IT industry is growing at a rate of 46% per annum (Computer World 2001) and is accepted now as an industry norm. Some implications of this trend to IT professionalism are discussed below:

- The value of the vendor professional certification is often considered by employers and customers to be of higher value than university qualifications. The vendor certifications have no pre-requisite entry level and provide a mechanism to open up the IT industry to non Computer related graduates.
- The product related certification restrict themselves to product related knowledge and do not provide the general all round background theoretical information and core principles learned in universities. Many people can enter the IT industry without a core understanding of the fundamentals of IT in general.
- As the professional certification is product based, it has a time dependent element to it. The certification, knowledge and value is only relevant when the

[19] http://education.oracle.com/pls/web_prod-plq-dad/db_pages.getpage?page_id=3
[20] http://www.cisco.com/web/learning/le3/learning_career_certifications_and_learning_paths_home.html
[21] http://h10017.www1.hp.com/certification/

product is in demand in the market place. In many cases, given the rate of change of technology, this can range from a few months to a few years. After which the certification and skill value is greatly diminished and the person needs to seek certification for a new product.

This approach creates a see-saw effect of skills and professionalism where the value of certification is for a short period of time, rather than building on the experience of the IT professional. In this model only current skill is valued rather than experience.



Examples of time related skills

Figure 7 See-Saw of Professional Certification

It is my opinion that while the vendor related professional certification serves a purpose to ensure suitable qualified product specialists are available to the market place, their adoption as an industry norm is having a detrimental affect on the IT Profession in general. The certification process creates short term skills and short term career paths for IT practitioners and are producing professionals high in product knowledge but often lacking in core IT and computer fundamentals.

The fundamental concept of what is or should be an IT profession needs to be addressed if we want to reverse the trend of students selecting IT as a career. We need to create a long term value proposition for prospective students who choose

IT. The current professional certification process is focused on short term value which as has been experienced many times in the IT industry can quickly lose its value as technology changes.

Instead of a 'see-saw' value to professionalism, we need to create a situation where the value of an IT professional increases with experience and provides a long term career. This can be done in conjunction with product certification, rather than instead of it.

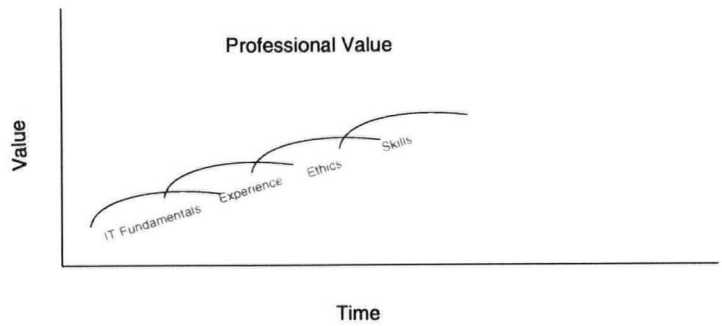


Figure 8 Professional Value

In the next chapter we will investigate what professionalism is and how it manifests itself in various other professions. We will use this information in subsequent chapters to compare it with the current implementation of professionalism in the IT industry and suggest any changes necessary.

Chapter 3 : Professionalism

In order to understand improvements to the IT profession, we will examine the literature on professions, professionalism and the IT profession. This material will help us understand what the core elements of professionalism are and how the professions earn and maintain their position in society.
In subsequent sections we will use the information gained in this section to compare and contrast the current implementation of the IT profession and suggest improvements.

Before progressing further, we need to consider our understanding of the definition of a profession.

The Oxford English Dictionary defines a profession as *'a vocation in which a professed knowledge of some department of learning or science is used in its application to the affairs of others or in the practice of an art founded upon it'* (Oxford English Dictionary).

This definition is endorsed by Carr-Saunders & Wilson (1964) who go on to further explain that *'special competence acquired as a result of prolonged and specialised training, is the chief distinguishing characteristic of the professions'* and that *'a profession can only be said to exist when there are bonds between practitioners, and these bonds can take but one shape – that of formal association'.*

Larson (1977) defines professions as '*occupations with special power and prestige'* and *'Society grants these rewards because professions have special competence in esoteric bodies of knowledge linked to central needs and values of the social system, and because professions are devoted to the services of the public, above and beyond material incentives'*

While these definitions help us define what we mean by a profession, we will examine the attributes or characteristics of professions as we go through this review.

This review will be structured in four major sections as described below:

1. **Sociology's view of professions**

   The classical three professions (Clergy, Medicine, Law) and some might consider military service as a 4th original profession have been in existence practically since time began, and form the basis for many of the professions that followed. Throughout history these remained the dominant professions with very few additions up to the late 19th and early 20th century. Following the industrial revolution, coupled with the growth of new areas of skill and knowledge the range and number of professions started to increase.
   Our review of the work done in the area of professions and professionalism starts around the beginning of the 20th century. We will discuss the main research themes within professions and professionalism from this period.

2. **Characteristics of Professionalism**

   While discussing professions, there are characteristics or attributes of professions that contribute to their success and acceptance in society. In this section we will discuss these.

3. **IT as a Profession**

   IT as a profession has also been the subject of some work in recent years, we will examine the research done to date and discuss its effectiveness.

4. **A Professional Model**

   In this section we will develop a model of professionalism based on the research in the previous sections. This model will be used in the next chapter to document the implementation of IT professionalism by the various European Computer Societies.

Sociology view of professions

In the mid 20th century the **Functionalist** view of professions was widely considered. In this view the professions were seen as a necessary component of society which was required to have a stabilising effect and to maintain a working order.

From the early part of the last century, writers like Carr-Saunders & Wilson (1964) viewed professions as an intrinsic part of society whose role was to :
'Inherit, preserve and pass on a tradition... they engender modes of life, habits of thought and standards of judgement which render them centres of resistance to crude forces which threaten steady and peaceful evolution... The family, the church and the universities, certain associations of intellectuals, and above all the great professions, stand like rocks against the which the waves raised by these forces beat in vain'

Professions were in essence the *corps-intermediaries* between the individual and the state.
Durkheim (1957) re-enforced the functionalist approach by emphasising the ethics and moral standing of professions which he saw as necessary to maintain the working model of society both nationally and internationally as Lynn (1963) writes *'Our professional institutions are .. an important stabilizing factor in our whole society and through their international associations they provide an important channel of communication with the intellectual leaders of other countries, thereby helping to maintain world-order.'*

The functionalist view of professions dominated the mid part of the last century, which focussed on the stabilising role professions had in society and how they were necessary to ensure the smooth and correct running of society.

The functionalist view of professions was expanded by writers looking at the **traits of professionalism.** Writers such as Marshall (1963), Goode (1957), Etzioni (1969) viewed professions through the traits they exhibited. In this area of research, occupations were analysed and compared with an ideal set of traits and classified into profession, semi-profession or non profession. This approach was re-enforced by the development of a Guttman scale of Professionalism by (Hickson & Thomas 1969). The comparison of traits exhibited by occupational groups against set standards was of interest to researchers in the 1960's but lost momentum shortly after that.

From the 1970's onwards the **Interactionist** view of professions was emerging led by the Chicago school of sociology. This approach focussed less on structure or formal definitions of professions, but on how professions interacted with society. Their view was that studying this interaction gave us a better understanding of professionalism.

Within this view, several elements of professional interaction with society were discussed.
Professional Power was seen as a dominant trait in some professions, notably medicine and law. How professions gained their power and use of power became an area of study by (Freidson 1986).

The **Producer-Consumer** concept of professions developed in the 1970's. The approach here was that professions interact and conduct business within society as producers of professional services and consumers of this service. The nature of this relationship and the control that one group has over the other was mooted by (Johnson 1972) and this area of research examined the dynamics between the two groups.
In the background another area of research within professions was emerging relating to how professions interacted with society and their role as **Social Actors.**
(Hughes 1963) pointed out that we were asking the wrong question all along, rather than asking *'is this occupation a profession'*, we should be asking *'what are the circumstances in which people in an occupation attempt to turn it into a profession and themselves into professional people'*

In my view this fundamental change of direction in the research literature is the most interesting and relevant to the study of IT as a professional organisation. The focus prior to this was on function, structure and how professions interacted with society.
This question by Hughes, changed the focus to the occupational group of people themselves in determining and maintaining professional status.

Freidson (1983) goes on to say that *'one does not attempt to determine what a profession is in an absolute sense so much as how people in a society determine who is a professional and who is not, how they 'make' or 'accomplish' professions by their activities.'*

The basic questioning from Hughes created an area of study focusing on people's motivation for professionalism and their desire to achieve it and examines 'what professions actually do in their everyday life to negotiate and maintain their special position' This work was dominated by (Larson 1977) and with her focus on the **Professional Project.**

Larson summarises her approach to the professional project as :
'Professionalisation is thus an attempt to translate scare resources – special knowledge and skills – into another – social and economic rewards. To maintain scarcity implies a tendency to monopoly: monopoly of expertise in the market, monopoly of status in a system of stratification'.

The Professional Project is pursued both for economic and social gains and can visually be represented as in Figure 9 Professional Project (Larson 1977) .
The basic premise is that the drive towards monopoly increases the scarcity of knowledge and hence increases the value and social status of the people who posses it. Professions that can achieve **monopoly** or near-monopoly state can drive a 'regulative bargain' (Cooper et al, 1988) with the state. Many professions contribute to their monopoly status by controlling entrance to their profession.

Abbot (1988) uses the term **jurisdiction** as an important aspect of professional life and it is the interrelation of this jurisdiction with professions and the state that gives professions their power. In some cases occupational groups compete with each other for control of its jurisdiction.

Burrage et al. (1990) introduces an '**actor-based framework** for the study of professions'. The actors are 1) practicing members, 2) the state, 3) the users and 4) the universities. Burrage studies the inter-relations between these 4 actors as a mechanism to advance our understanding of professions.

Core to the aims of many professions is the establishment of **Social Closure** (Weber 1949) bringing together all elements and influences for the profession as shown in the diagram below.

Characteristics of Professions

In this section we will discuss the main characteristics of professional organisations in terms of their position in society. These characteristics appear in various 'quantities' in the different professions and in some way reflect their status in society.

At a high level professions can be described along three major dimensions (Cogan 1953):

1. **The Cognitive Dimension**
   The Cognitive dimension relates to the intellectual knowledge of the body of people in the profession and the training and skills requirements necessary to become a member of the profession.
2. **The Normative Dimension**
   The service aspect of the profession is covered under the Normative Dimension and includes ethics, codes of practice and self regulation.

3. **The Evaluative Dimension**

   The Evaluative dimension relates to the position the profession has in society and with respect to other professions and occupations.

The above dimensions are general characteristics of professions, however to get a more thorough understanding of professions, we will examine the work of (Larson 1977) and her work on the **'Professional Project'**. This project examines how occupational groups establish a profession and then continue to focus on improving it and maintaining its status.

The starting point in establishing a profession is the identification an **'occupational group'** who have the objective of creating and maintaining a profession for that group. The members of the occupational group generally share the same (or similar) educational standards (in scare supply) and have the common objective of economic and social gain. They want to gain both economically and in social prestige as a result of being part of a profession.

Taking this as an objective, the path by which the group can strive for professional status (i.e. the Professional Project) is along the Economic Order and Social Order.

Core to the project is the quest to establish a monopoly of knowledge and control access to it. This is core, scarcity creates demand and demand creates wealth. Many professional bodies establish and control the entry to their profession thus artificially restricting supply to the market.

In considering the area of monopoly, it is important to define the **jurisdiction** of the profession (Abbot 1988). The jurisdiction defines the boundaries of the profession, what it does and what it does not do, in many cases narrowing the scope of the profession lends itself to more easily define a monopoly, e.g. Accountants have the monopoly for auditing company reports, pharmacists have the monopoly on dispensing prescriptions, etc. Jurisdictions also enable different professions to work together (in close market proximity) and to define the interaction between professions. Good examples of this exist in the construction industry, where multiple occupational groups have established

professions with well defined jurisdictions and clear responsibilities, e.g. Architects, Quantity Surveyor, Engineer, etc.

Jurisdictions are important as they scope the profession and the area of monopoly, the jurisdiction may be defined in multiple ways, e.g. legal rules, geographic, ethical basis, etc. We have also seen over the years that changes in jurisdictions can spawn of new professions from existing ones, e.g. dentistry from medicine and the multiple professions with the construction and engineering profession are some good examples of this.

Once the jurisdiction is defined; the profession generally defines its own entry criteria and in many cases restricts the number of entrants. Despite the vast number of University courses available, many professional bodies insist in setting and defining their own entry standards in addition to the university qualifications. This characteristic is one of the most powerful ways to manage the supply and demand of professional services thus propping up the economic and social gains associated with the profession. (Larson 1977) refers to this as '**producing the producers**', that is 'ensuring that all future entrants have passed through an appropriate system of selection, training and socialization, and turned out in a standardized professional mould'. This powerful characteristic of professional bodies takes the control away from the state in terms of supply of skill to the professional bodies.

While the monopoly of knowledge, skill or process helps restrict the supply and helps to provide economic benefit, we need to turn to other characteristics to help progress the social standing of professionals. Professions generally deal with knowledge rather than products and therefore there is an element of intangibility with regard to the services that they offer. MacDonald (1995) states 'these occupations are offering services which not only cannot be seen in advance in the shop-window, as it were, but which also require the customers to trust the practitioner with their lives, their health, their money, their property and even their immortal souls. As there are no goods for inspection the customer has to **trust** the practitioner himself and trust is bestowed on those who appear **respectable**'

So trust and respectability are key attributes of professionalism and practically all professional bodies maintain codes of standards, ethical guidelines and even oaths to help provide this level of trust and respectively. This attribute is preciously guarded by

many professions through the **self governing** mechanisms of their profession. Most professional bodies have developed a code of **ethics** to which their members sign up to. In recent years, many examples of mis-management and poor self governance by some professions have result in independent monitoring of standards. This independent regulation protects society and the consumer but in some instances weakens the professional body.

The environment in which professional bodies exist and operate plays a key role in determining the economic and social status of professions.

The **State** is a key player in the relative position of professional bodies. The state in many cases provides the legalisation to create the monopoly for the professional body. (Cooper et al 1988) talks about a **regulative bargain** that must be struck with the State and only the State can provide true monopoly to a profession. Consequently the state can remove the monopoly status associated with a profession and open the market to new entrants; hence the relationship with the state is managed carefully and jealously guarded by many professions. State monopoly exists for many of the established professions, but is rarely acceptable for newer professions in the marketplace today.

Other institutions of the state which play a key role in the relation with professions are **educational intuitions** who supply the skilled people or 'raw material' for consideration by the profession for entry. The relation between university and profession is also a delicate balance and the professional bodies work hard to maintain their area of jurisdiction, i.e. only they can award professional status irrespective of the standard of education provided by the universities.

The relation between the state organisations and the professional bodies needs to continually worked on, lobbied and maintained as changes in this relationship could change the jurisdiction or treasured monopoly status of professions.

The **cultural and social environment** in which the professions operate is another key attribute of professions. Core to the profession is the element of trust and respectability of a professional as mentioned above. The relationship between the professions and society is under continuous change as the values of society change. Sometimes this relationship is affected by members of the profession itself or by the workings of the

self governance process of the professional bodies. In recent years, we can point to many examples where the standing of professional groups in society have been affected by members of the profession itself and have negatively affected the trust and respectability that the profession has in society. Recent examples of professions which have been negatively affected in terms of their social standing are; clergy (due to child abuse), police (due to falsification of evidence), medical doctors (due to lack of self regulation), politicians (due to corruption). These recent examples demonstrate the delegate nature of a professions relationship with society and the importance of continuously looking after it.

An important part of the relationship between professions and society is understanding the **core value** proposition of the professional body. Each professional group needs to be associated with a core value which is what they stand for and for which they gain trust and respect from society. The relative value society puts on the core value of a profession reflects the level of trust and respectability the profession has in society. The 'value' of the professions core value is not constant and may change over time depending on society's needs. Examples of professions and their core values are shown in the following table :

Profession	**Core Values**
Clergy	Holiness, spiritual healing, confidentiality, high morals
Medical	Health protection and healing, ethical oath
Accountants	Ethical, independent auditors, thorough
Architect	Design innovation
Police	Protection of life and property
Lawyers	Law and order, administration of justice

Table 6 Core Value of Professions

The final stage of the Professional Project is what (Weber 1949) describes as **Social Closure.** This is where there is a status quo / harmony between all players within the professional project, the sum of which provides economic and social gain for members of the profession.

The Social Closure is not a permanent state but one which is made up of the elements mentioned in this section and their interaction with each other. The occupational group

which becomes a profession has to continually work to maintain it. The role of Professional bodies are there just for this purpose. The primary purpose of these institutions is to protect the profession and to maintain the Social Closure.

As well as the relationship professionals maintain with society, one of the roles of professional bodies is to form relationships with the profession itself. Professions depend on the establishment of professional bodies to exist. These institutions are powerful organisations which in some cases as (Lynn 1963) writes are 'an important stabilizing factor in our whole society' and may even help to 'maintain world-order'. The objective of the professional bodies is the continued promotion of the profession itself. It does this by working to maintain the 'Social Closure' and by developing the members within the profession. The members themselves also look to the professional body for value. (MacDonald 1995) writes that *'The elite of the (professional) group articulate its objectives and set in train the work needed to achieve them, and although the individual members may pursue their own personal ends and may not be fully conscious of the group goals, they are normally sufficiently in tune with the groups objectives for these to be pursued'*
As well as the preservation of their professional status, the professions look to the professional bodies to enhance their career, either through professional recognition (e.g. chartered status) or through contacts. For professionals, the career development aspect of the professional bodies is an important benefit.

In the above section, we discussed the main characteristics or elements of professional. These characteristics exist in all professions, maybe in different quantities and are a good way to assess a profession. In later sections we will discuss how the IT profession measures up against these characteristics.

IT as a Profession

'*We are seen as passionate innovators and prolific inventors. We are seen as nerdy – single mindedly focused on IT and inept with social relationships. We are seen as technology centered, not human or user centered. We are seen as oblivious to the social, political and business consequences of our tools and service. We are seen as avoiding responsibility for malfunctions or our tools and breakdowns in our service. We are seen as difficult to communicate with*'. This is the view of IT as expressed by Peter Denning in 'Who Are We ?', (Denning 2001b).

This is also the challenge facing the establishment and acceptance of a credible IT profession.

There is a considerable amount of research into professions by the IT community itself. Many of the areas addresses are similar to those mentioned in the previous section on the characteristics of a profession; however it is interesting to see the focus areas and motivation for professionalism from within the IT profession itself. In this section, we will look at some of the discussion areas within this area of research.

Interestingly, the main work on professionalism in IT originates from the US and is driven by the two main computer societies; the Association of Computing Machinery (ACM) and the Computer Society of the Institute for Electrical and Electronic Engineers (IEEE). The core thread of research in professionalism of IT is driven by the work of Peter Denning (past president of the ACM and academic). It is worth noting that unlike the European Computer Societies, the ACM and IEEE have a bias towards the academic elements of computing and much of their discussion revolves around the changes and improvements needed in the IT curriculum.
In Europe, there is less of a focus on curriculum development and more on IT professions in society.

We will discuss the work done on IT as a profession under the following headings:

- **Professional Definition**. Many meanings of professionalism are discussed in the literature on IT, we will look at the similarities and differences in the proposed definitions.

- **Jurisdiction**. There is a constant debate within the literature not only on the scope of the IT profession, but also on whether some disciplines deserve professional status in their own right. The main debate raging is between Computer Science and Software Engineering.
- **Certification and Licensing**. Since the early days of computing, accreditation and certification standards were developed. We will take a look at these and discuss how they have evolved over the years.
- **Curriculum Development**. As much of the work on IT professionalism has been conducted by academics, it is not surprising there is a body of work available on the changes required in the education of the IT professional in support of the professional goal.

Professional Definition

Professional aspiration by the Information Technology community has been around for decades. Back in the 1970's (Harris 1979) noted that it was 'not generally recognized that personnel in the computing industry constitute a profession' and 'whenever the term computer professionals is used it is done either lightly or in anticipation of things to come'.

Harris (1979) uses Barber's (Barber 1965) definition of what it means to be a profession. 'Professional behavior may be defined in terms of four essential attributes: a high degree of generalized and systematic knowledge; primary orientation to the community interest rather than to individual self-interest; a high degree of self control of behaviour through codes of ethics internalized in the process of work socialization and through voluntary associations organized and operated by the work specialists themselves; and a system of rewards (monetary and honorary) that is primarily a set of symbols of work achievement and thus ends in themselves, not means to some end of individual self-interest'.

Starr (1982) states 'A profession, sociologists have suggested, is an occupation that regulates itself through systematic, required training and collegial discipline; that has a base in technical, specialized knowledge; and one that has a service rather than a profit orientation, enshrined in its code of ethics'

(Denning 2001b) borrows from the view of other professions to propose that professionalism has 'four hallmarks' and discusses how the current IT profession stacks up against these hallmarks.

- A durable domain of human concerns
  The durable question is clearly met, computers and communication technology are now deeply engrossed in our every day life, from running critical systems in finance, industry and medicine to being an integral part of our social and leisure lives. The internet, databases, phones, applications etc. are now part and parcel of our lives and are now inseparable.
- A certified body of principles (conceptual knowledge)
  Computer Science and Information technology is recognized world-wide as a field of education with practically all universities offering computer related degrees. These course help enshrine the core principles of Information Technology while professional organisations like computer societies help to maintain the information relevant and current.
- A codified body of practices (embodied knowledge including competence)
  Denning suggests that this 'hallmark' is not met. While there have been attempts to define standards and level of competence in IT (e.g. The Institute for the Certification of Computer Professionals (ICCP)), in general the results of such initiatives have not being successful. There are also initiatives in industry certification and licensing which have yet to bring substantial benefit to this criteria.
- Standards for competence, ethics, and practice.
  While many computer societies have published codes of ethics, they fall short in following through with support, guidance and policing. (Rosenberg 1998) is vocal about the support provided to members of professional IT societies once a code of ethics has been published. He argues for more follow through in the implementation of ethics. Denning argues that due to the lack of implementation of the code of ethics, this criteria is only partly met.

Rosenberg (1998) also claims that professionals 'claim authority, not as individuals, but as members of a community that has objectively validated their competence' and that 'professional authority also presumes an orientation to specific, substantive values' for example, 'in the case of medicine the value of health'.

This concept of **Value** is a core theme in the attributes required to become a professional.
Many authors focus on the need for IT professionals to add value to society.

Interestingly, Denning & Dunham (2001) suggest that IT is the first profession of the 'Third Wave'. The first two waves being the Agrarian Age and the Industrial Age. The third wave is called the Information Age or Network Age. In the third wave there are many changes to society; culturally, socially, institutionally and morally. The Information age brings with it a new meaning of value; wealth is created by transactions that bring value to the customer. 'To function effectively in the third wave, every professional whether in IT or not, must deal with customers through value-generating relationships' and it is this what will differentiate professionals from technicians. In the third wave, the driving force will be the customer and value to the customer not volume or quantity will be become the measure of wealth. In this age, a customer is defined as 'anyone to whom the professional makes a value-producing promise'.
To create value in this age, two types of skill are needed, technical skills and value skills to enable the professional connect with the customer. Both these skill types are necessary to be seen as a professional. (Denning and Dunham 2001) propose a list of values skills needed by professionals as shown in the following table:

Value Skills	
Value Skill Sets	**Examples**
Coordination	Request, offer, promise, negotiate counteroffer, defer, decline, insist
Customer Relations	Listen for customer concerns, articulate a value proposition, make declarations, co-design value propositions with customers
Commitment Management	Maintain commitment records, allocate time and resources to each commitment, adjust load to one's capacity, communicate with customers about progress, build trust through a history of kept commitments
Teams	Declare a mission, invite members, make commitments to the team leader, manage commitments together, measure progress, share assessments within the team, raise and resolve red flags
Lifelong Learning	Understand levels of professional competency, seek situations and mentors for advancement, obtain certifications of professional competence from recognized authorities
Business and Entrepreneurship	Listen for widely held concerns, follow and interpret trends the world, identify innovative practices that can solve central problems, build an offer, a business plan, and a team, practice within a code of ethics

Table 7 Value Skills for Professionals

(Holmes 2000) takes up the value theme by saying that 'a profession, in contrast to a craft or trade, has a direct effect on the community and its members, thus a profession has a primary responsibility to the community that the profession's effect upon it be a benevolent one'. Holmes goes on to say that the ' future health of the computing profession depends on its members take an interest in issues outside its body of knowledge and skills'

Another common theme through the literature is the need for **Innovation.** (Denning 2004) cites innovation as one of computing core practices. However even though the computer science community is noted for its innovations and inventions, it is the pragmatists working face to face with clients that are the real driving force behind

innovation in the IT profession. In 'Crossing the Chasm (Denning 2001a), it is argued that the computer science community need to embrace this change and link inventions to innovations that have an effect on clients and society. The Chasm that Denning refers is the difference between treating computing as a discipline and a profession.

In terms of the professional lifecycle development, there is general agreement on the main elements of an established profession (McConnell & Tripp1999)

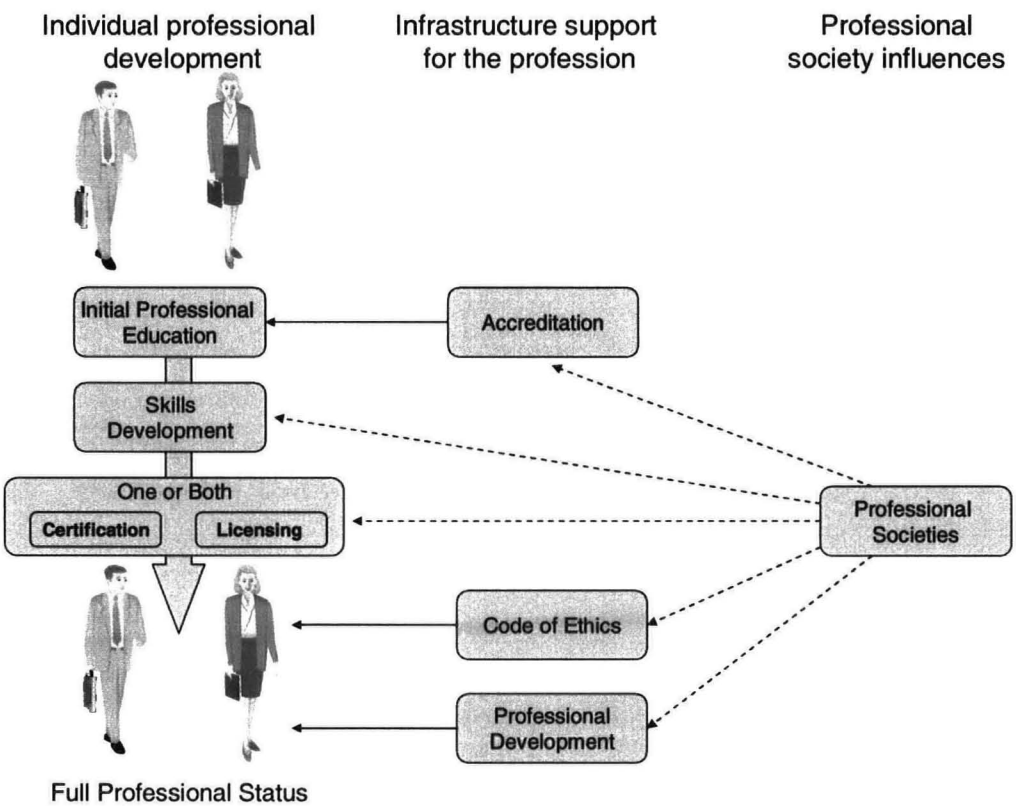


Figure 10 Elements of an established profession

As a contradictory view of professions, some authors suggest that IT should not be a profession in itself but rather as a discipline within other professions. (Holmes 2002) notes that 'in some ways the computing profession can be seen as a secondary profession, providing services to other professions and occupations' and Orlikowski & Baroudi (1989) argue that IT workers should not be called professionals at all and 'instead should be recognized as an occupational group with distinct occupational culture, required knowledge set, and skills'.
These views however are not widely supported in the literature.

Jurisdiction

In the article 'Who Are We?' (Denning 2001b) opens up with saying that to 'most of the hundred millions of computer users around the world, the inner workings of a computer are an utter mystery'. In the majority of cases, the users do not need to know how a computer works nor do they necessarily care. They expect 'information technology professionals to help them with their needs for designing, locating, retrieving, using, configuring, programming, maintaining and understanding computers, networks, applications and digital objects'. In short they rely heavily on the role played by IT professionals, but the question is asked who are these people that society is now so dependent upon.

Given the disperse roles and skills involved in IT, Denning categorized IT professionals into 3 broad categories within which contain at least 40 disciplines.

The three main categories are:

1. The IT Specific Discipline representing the core intellectual area of IT,
2. The IT Intensive Disciplines include the non-core IT disciplines in which IT plays a fundamental and crucial role, without which many of their disciplines could not function and
3. The IT Supportive Operations represents the set of IT professionals whose function is provided and support the IT infrastructure that everyone uses. These categories and disciplines are shown in the following table (Denning 2001b).

IT Profession		
IT-Specific Disciplines	**IT-Intensive Disciplines**	**IT-Supportive Occupations**
Artificial intelligence	Aerospace engineering	Computer technician
Computer science	Bioinformatics	Help desk technician
Computer engineering	Cognitive science	Network technician
Computational science	Digital library science	Professional IT trainer
Database engineering	E-commerce	Security specialist
Computer graphics	Financial services	Systems administrator
Human-computer interaction	Genetic engineering	Web services designer
	Information science	Web identify designer
Network engineering	Information systems	Database administrator
Operating systems	Public policy and privacy	
Performance engineering	Instructional design	
Robotics	Knowledge engineering	
Scientific computing	Management Information systems	
Software architecture		
Software engineering	Multimedia design	
System security	Telecommunications	
	Transportation	

Figure 11 IT Profession Disciplines

Denning broadens the scope of members of the IT profession (Gehl 2000) to those who support the IT infrastructure, e.g. those who provide telephone support for hardware and software problems, web designers etc.

Perhaps the biggest debate within the jurisdiction of the IT profession is whether Software Engineering is a separate profession. There are numerous articles Pour et al. (2000), McConnell & Tripp (1999) debating the pros and cons of each side. IEEE (IEEE Standard 61012) defines Software Engineering as 'the application of a systematic, disciplined, quantifiable approach to the development, operation and maintenance of software'.

Some element of the debate revolves around the previous section on innovation being driven by practitioners rather than the computer science community.

The debate is also fuelled by the difference stances taken by the two largest computer societies. The IEEE argues strongly for Software Engineering as a separate profession and support certification and licensing, the ACM on the other hand believes that the Software Engineer is a discipline within the IT profession and is not mature enough to be established as a separate profession. The ACM argues that the profession is better served by considering all the disciplines within a single IT profession.

Certification and Licensing

The Institute for Certification of Computer Professionals (ICCP) was founded in 1973 by eight of the leading computer societies in North America (including the ACM and IEEE).

Its primary focus was to develop certification programmes to recognize the skills of IT professionals and to contribute to the general standardization and quality of the industry's skill.

Two main certification programmes were launched 'Professional Certificate in Data Processing (CDP) and the 'Certificate in Computer Programming (CCP)' (Ketchel 1981), (Sopka 1981). While standardizing the skill level within the profession (Sopka 1981) argues that certification in itself does not create professionals. 'They can, however, provide an effective means of recognizing those individuals who have attained a level of excellence in their knowledge and experience in a field' However, he argues that 'Integrity cannot be tested for. It must be demonstrated consistently by the individual and carefully protected against taint by careless practices'.

While the ICCP certifications are long established, their use and recognition within the industry has declined substantially and have been somewhat over taken by industry certification programmes.

As discussed in chapter 2, many certification programmes are now created, administered and driven by the main IT vendors. (Hitchcock 2005) provides an insightful view of the pros and cons of industry certification from multiple perspectives (the individual, employer, consumer, industry, profession and academic). The individual generally receives both career and financial benefits by pursuing certification and 'it is a statement of the skills you take with you from role to role, gives value to those skills,

recognizes that you are a professional at the work you do and you have a certificate to prove it'.

Employers benefit from knowing what they are getting, and certification enables a new hire to 'hit the ground running'. 'Certification brings clarity, allowing identification and definition of skills' and is 'one of the most common tools used by employers to measure the capability of a potential hire'. One common criticism of certification is that it is a measure of skills rather than experience or the persons future ability to adjust to technologies.

Certification gives confidence to the consumer that the person is competent in the technology being deployed and should result in a higher level of service.

The IT industry is managing both the supply and demand for certifications and their main aim is to enhance their product in the market place by providing a supply of recognizable and qualified professionals. The downside is that this certification could sometimes reduce competition in the market place by the professionals always recommending one vendor's technology. As we a saw in a previous section, the industry certification approach has the danger of de-valuing a person's skills due to a technology change.

The IT profession takes a dimmer view of the industry certifications, they are focused on the professional development as a whole rather than aligning themselves to individual products. There is scope and a need for product certification, but this should not take the place of professional certification, covering skills, experience, ability, integrity, social responsibility, etc.

Many academic institutions include product certification as part of their curriculum to help address the demands of future employers... many feel that this practice is unwise as it creates 'paper certifications' of little value.

Another debate within the IT profession is the requirement for licensing. Licensing is permission to practice given to an individual by the state. In some cases the permission may be reliant on achieving a certification level.

(Denning 2000) distinguishes between certification and licensing. 'Certification is a process whereby community representatives warrant that you have certain skill. Licensing: permission granted by a state for you to practice in that state'.

In some US states (e.g. Texas), there is a growing interest in licensing IT professionals, though mainly in the area of Software Engineering. The intention is to ensure that there is control and accountability over the people who develop applications and systems. The licensing issue is raging within the Software Engineering 'profession' and has created differences between the two big computer societies in the US (ACM & IEEE). Many feel that the profession is not mature enough to be licensed as the certification levels (that the license are based on) don't necessarily give the level of guarantee and protection implied under license. As the IT profession matures, the issue of licensing will come more to the fore.

Curriculum Development

The changing role of the IT professional is causing a change to the curriculums for educating such professionals. Universities tended to focused on ensuring students have the core concepts of computers as well as training them in 'industry ready' skills (and possibility industry certification).

However to become a profession, we need to expand the skills and lessons above. Professions need to put an emphasis on creating customer value and strengthening the understanding and communication with both the customer and society. Denning (Denning 2001a) talks about 'Crossing the Chasm' in tackling this gap between technical education and that needed for professionalism. (Dahlbom & Mathiassen 1997) talk about the 'Mechanistic and Romantic views'. Mechanistic views focus on machines and technology while the Romantic view focuses on people, how they interact and change and how they might use the machines. Similarly (Denning 2001c) calls for a second kind of knowledge 'which includes knowing how to listen, to design, to persuade, to be organized for new learning, to be professional and even to be trustworthy and honest'.

So the literature is suggesting that we need a balance between the 'hard' and 'softer' elements in our curriculum as a foundation for future IT professionals.

Another major shortcoming (identified by Denning 2001a) in our current educational development is that they miss a huge realm of knowledge called 'Practices' . 'Practices

are all the routines, habits, skills, procedures, and processes you have embodied and exercise without thought. When you are judged to be a competent professional, it is your practices that are being assessed not your conceptual knowledge'
It is argued whether or not practices should be taught in universities or on 'apprenticeship' as with other professions (e.g. accounting, law, medicine, engineering etc.)

Denning also suggests that North American employers and business executives are dissatisfied because computing graduates lack practical competence. They cannot build useful systems, formulate or defend a proposal, write memos, draft a simple project budget, prepare an agenda for a meeting, work in teams, or bounce back from adversity; they lack a passion for learning. The current concept-oriented curriculum is well suited for preparing research engineers, but not the practice-oriented engineer on which competition increasingly depends'.

The education theme within the IT profession is strong and alive partly due to the fact that the ACM and IEEE are more closely linked to academia than in Europe. What is clear is the curriculum development necessary for IT professionals is part of a larger professional development process and not solely within universities.

A Professional Model

In the previous sections we discussed both the concept of professionalism and the general characteristics that professions have. We then examined the IT profession and discussed the work done to date to professionalise the IT profession.

In this section we will pull together the material discussed earlier in this section to develop a model of professionalism which we can then use in the next sections to compare with the current implementation of IT professionalism.

The model developed here represents the different dimensions of professionalism and we will see that different professions and different implementations of the IT profession will have different strengths along the various dimensions. There is not necessary a right or wrong professional model, but this model will be used to understand the current

status of the IT profession and to suggest areas that might need to be adjusted in order to meet the aim of developing a stronger profession.

We will develop the professional model using both major and minor dimensions.

Dimensions

We describe the major characteristics of professions in terms of dimensions. These major dimensions represent the core elements of professionalism. Each major dimension is further composed of minor dimensions which provide us with greater detail of the profession's implementation.

The major dimensions are :

- **Jurisdiction**
  The jurisdiction of a profession is necessary to clarify the scope and responsibilities of the occupational group representing the profession. This dimension represents the degree that the membership and jurisdiction of a profession is defined. Within this dimension the minor dimensions are:
  - **Occupational Group**
    Occupational group define the membership of the profession. This dimensions defines the degree to which there is clarity over who is in the profession and who is not.
  - **Inter-relationship with other profession**
    Within society professions interact with each other. This dimensions reflects the clarity of relationship between a profession and other professional and non-professional groups.

- **Knowledge**
  The Knowledge dimension represents the clarity, control and content of the knowledge required by members of this profession. Specialised knowledge is a key element of any profession and is reflected in the training and entry requirements to the profession. The minor dimensions of the Knowledge dimension are;

- **Level of Knowledge**

  One of the characteristics of professions is the unique and high level of knowledge its members process. This dimension represents the level of specialised knowledge required by members of the profession.

- **Entry Level Criteria**

  Professions define the entry criteria for members. This dimension represents the level by which the entry level and the number of entrants is controlled by the profession itself.

- **Academic relationship**

  Professions need a good supply of skilled graduates in order to stimulate and grow the profession. This dimension examines the degree of relationship and influence that the professional body has with universities and other academic institutions.

- **Industrial relationship**

  A professions relationship with companies in industry is important to the recognition and status of the profession. The degree of relationship and recognition of the professional body with the industry players is measured in this sub-dimension.

- **State Relationship**

  A professions relationship with the state affects its social standing and power. Many professions are given power by the state that enhances its professional status. This dimension addresses the degree to of relationship between the state and the profession. Its sub-dimensions are :

  - **Monopoly**

    Many professions enjoy monopoly status in their professional area. This monopoly is provided by state legislation. This dimension addresses the degree of monopoly provided to the profession by the state.

  - **Licence**

    Some professions are licensed by the state to practice. This dimension represents the degree of licensing applied by the state to this profession.

  - **Influence**

    Many professional depend on the state to maintain its status in society. Therefore the professional body needs to protect its privileged position and influence legislation which impacts on its jurisdiction or position in

society. This dimension measures the degree of influence the professional body has with the state.

- **Self Regulatory**

  Many professional bodies control the standards within their own profession. This dimension measures the degree which the professional body regulates its own members.

- **Customer Value**

  Professions must provide value to customers and society. This is one of the main criteria that differentiate professions from trades and crafts. This dimension measures the degree that the profession's value is understood and valued by customers and societies. Its sub-dimensions are:

  - **Code of Ethics**

    Every profession needs a code of ethics by which its membership abides. This dimensions represents the both the quality of the code and the degree by which the profession regulates its members with respect to this code.

  - **Value Definition**

    Professions exist to serve customers and societies. This dimension represents the degree to which the profession's value is understood and appreciated by customers and society.

  - **Trust and Responsibility**

    Professions have a social standing in society. This dimensions addressed the perceived trust that exists between profession members and customers or society and the degree of responsibility that members of the profession take for their actions and work.

- **Membership Value**

  Professional groups consist of members and must give value to its members as well as customers and society. This dimension measures the value the professional body provides to its members. Its sub-dimensions are :

  - **Career Path**

    Career planning and advancement is important to members of any professional society. This dimension measures the support provided by the professional body to a member's career.

- **Professional Support**

  In day to day professional work, members may come up with issues (ethical, knowledge related or client related). The support mechanism available to professions members is measured in this dimension.

- **Continuing Learning**

  Within every profession there is continuous change and the professional has to keep up and adapt to this change. This dimensions measures the support professional bodies provide to professionals to keep abreast of new developments and equally how the professional body ensures its members are knowledgeable and keep abreast of the new developments.

The professional model above represents a generic framework by which to understand the maturity of professional organisations. The major and minor dimensions represent the major elements of any profession and the profession's strength on each dimension has an influence on the status of the profession and its position in society. In comparing various professions we will assign a scale to each dimension in order to be able to compare and contrast with other professions. We can use this model to understand how each profession maps to these dimensions and use the opportunity to learn from it to help improve the IT profession as implemented today.

The above model can be graphically represented as shown below.

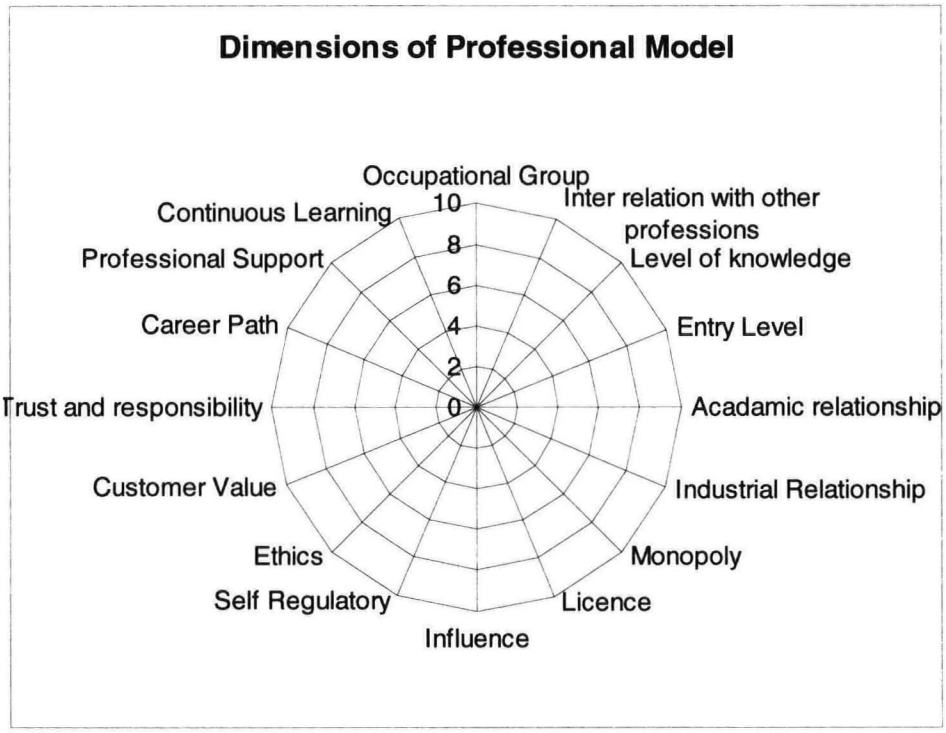


Figure 12 Dimensions of a Professional Model

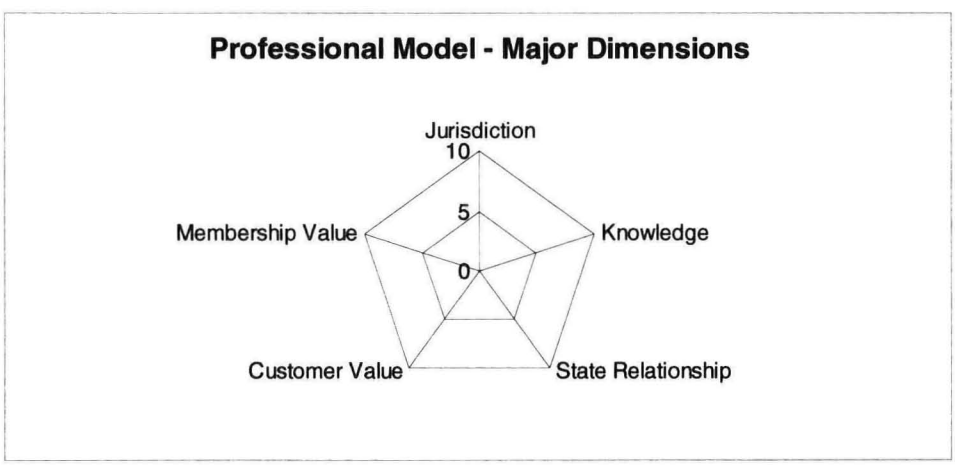


Figure 13 Professional Model - Major Dimensions

Dimension Value

After defining the dimensions of a professional model, this section defines the value along the dimensions. These values will be used to collect data and to compare and contrast the various implementations of IT professional organisations across Europe.

Major Dimension	Minor Dimension	Undefined	Partially defined	Very well defined
Jurisdiction	How well defined is the occupational group in your Computer Society?	Members generally employed in IT. No specific categories of roles defined.	Members employed in the IT industry. Broad categories of Job roles defined, e.g. Software Engineer, IT Architect, Technical Support	Clear roles and responsibilities of members. Clear job, process and task definition of all members in society.
	How well defined is your members relationship with other professions?	Unclear relationship between members and other professionals, e.g. Project Managers, Engineers, Accountants, etc.	General agreement and understanding of roles. No formal agreement/understanding in place.	Clarity of responsibilities and demarcation between IT Professionals and other Professions. For agreement/understanding in place.
Knowledge	How well defined is the level of knowledge required to be a member of your profession?	No specific educational requirements required.	Educational standards defined perhaps with experience alternative. Often alternative educational standards accepted (e.g. non-IT related degrees)	Knowledge required is specified and controlled by the profession. Strict adherence to educational standards required.

Major Dimension	Minor Dimension	Undefined	Partially defined	Very well defined
	What is your level of relationship with academic institutions?	No Influence on Academic Curriculum	Partial Influence. Seeks to advise and guide and partially successful in defining curriculum.	Strong influence on and participation in academic curriculums in Universities.
	What is your level of recognition with companies in Industry?	Companies are not aware of professional recognition for IT professionals	Companies are aware of profession, but do not make it a pre-requisite or recognise to practice.	Companies fully recognise status of members and as a pre-requisite to practice must be members of your profession.
State Relationship	What is the degree of monopoly your profession enjoys?	None. Ability to practice IT does not require membership of profession.	Partial. Only members of your profession have certain privileges but membership is not required to practice.	Profession holds monopoly status. Practitioners must be members of your profession to practice.
	Is Licensing required to practice your profession?	No, none required	Partial, in some circumstances.	Yes, mandatory

Major Dimension	Minor Dimension	Undefined	Partially defined	Very well defined
	What is your level of influence on state and public policy in areas affecting your profession?	None	Partial, in consultative mode only. Limited success in affecting policy.	Strong, always consulted and strong enough to influence changes
	To what degree is your profession self regulatory?	Not at all. No self regulatory mechanism in place or not/infrequently used.	Partially. Ability to affect membership of profession, but not licence to practice. Used with moderate frequency.	Fully self regulated, with ability to revoke licence to practice. Frequently used.
Customer Value	How well do you regulate your code of ethics?	Never, do not have a code of Ethics.	Code of Ethics defined, but no/little support to members and customers.	Strong code of ethics defined with support to members and customers.
	How clear is your core value definition understood by customers?	Unclear understanding of core value definition of profession by customers.	Multiple and often conflicting value definitions of profession understood by customers.	Strong clarity of core value provided by members

Major Dimension	Minor Dimension	Undefined	Partially defined	Very well defined
	What is the perceived level of trust and responsibility of your profession by customers and society?	Poor, seen as potentially mis-trustful and irresponsible. Numerous examples of such exist in society.	Mixed views, maybe no direct negative experience but general media perception.	High, seen as ethical and fully trustworthy, 'pillars of society'.
Membership Value	What level of career path do you provide for your members?	None, no focus on developing member's careers.	Partially, advice and guidance but not actively promoted or encouraged.	Strong, clearly defined career path with requirement and standards defined at each stage.
	What level of support do you give your members on professional matters (e.g. ethical, knowledge related, legal or client related)?	None or very little. Service is not provided to members.	Partial, advice and guidance on request / ad-hoc basis only.	High, office in place to support members on all aspects of professional activity.

Major Dimension	Minor Dimension	Undefined	Partially defined	Very well defined
	What level of support / resources does your organisation have to promote and encourage continuous learning amongst its members?	No programme in place.	Available on information only basis. No mechanism to ensure members maintain currency of skills.	Strong formal programme in place to ensure members up-to-date on current topics. Re-certification required to ensure currency of knowledge and skills.

Table 8 Dimension Values of Professional Model

Chapter 4 : Assessment of current IT Profession

In the previous chapters we analysed the meaning of Professionalism and developed a Professional Model that could be applied to the IT Profession. This model was developed to assess how closely today's IT Professional organisations (Computer Societies) match the model and will be used in later chapters to suggest actions that these organisations could take in order to improve their level of professionalism.
The focus of the model is on professional organisations rather than individual professionals, although these items are clearly related. My view is that strengthening of the IT professional organisations is a necessary step to strengthen the profession in general.

This chapter corresponds to Activity 3 of the SSM Methodology outlined in chapter 1, the purpose of which is to compare and contrast the model developed in the previous activity with the real world situation. This comparison will be done mainly by means of surveys with the main Computer Societies across Europe. This activity will also be used to validate that the model being developed is feasible and socially desirable and the outcome will be the differences between the model and reality which will be discussed in later chapters.

DATA collection

The purpose of the data collection stage is to assess the implementation of Professionalism by Computer Societies in Europe in relation to the dimensions of professionalism outlined in the previous chapter. This data would help us evaluate the maturity of the various Computer Societies and then help develop a list of suggested actions to the relevant stakeholders to enable them improve on their current state.

Method

The method of data collection used was a survey. This was the most appropriate mechanism to collect the information necessary to understand the current implementation of professionalism by the computer societies for the following reasons:

- Many European languages are in use and verbal feedback would involve interviews in all languages. Also, background information on the various Computer Societies on their web sites was generally only in their native language.
- Telephone interviews would be difficult due to the language issues and the cost and logistics to travelling to each of the countries would be prohibited, as well as most of the potential respondents would not be available during business hours.
- Written English questions with clear meaning and understanding was considered the most appropriate medium to interact with the various countries across Europe.
- Most of the officers of the Computer Societies across Europe are part-time roles and arranging interviews with them is difficult as most of them work on client sites.
- Email was considered the most appropriate and effective means of communication with the Computer Societies.
- The sample size of the survey was relatively small with a goal of receiving feedback from 6-8 various Computer Societies across Europe.
- The number of questions was relatively small (16) and hence the time to complete the survey would generally be less than 30 minutes.

However, there are some items in relation to conducting this research that we need to be aware of.

- As this is a European wide survey, we need to be aware of cultural factors in relation to the responses and the respondents understanding and use of the English language.
- The fact that as a worker-researcher within IBM may influence people's reaction to answering the survey; this could have either a positive or negative impact.

Having weighed up all the factors relating to the data collection method, I settled on a survey as the most appropriate method of collecting the information that I wanted.

Endorsement

One of the key objectives of the Doctor of Professional Studies (DProf) is making an important and relevant contribution to industry. This is very important and to ensure that the research I was pursuing met this objective, I engaged with the Council for European Professional Informatics Societies (CEPIS)[22]. This is an umbrella organisation representing Computer Societies in practically every country in Europe.

CEPIS mission statement[23] is a non-profit organisation seeking to improve and promote high standards among informatics professionals in recognition of the impact that informatics has on employment, business and society. Its goals are[24] :

1. To be the European IT professional network for Member Societies
2. To become the European IT certification organisation, working with educators, industry and other certification organisations
3. To be recognized by EU / European institutions as the leading independent IT Professionals organisation
4. To help ensure an adequate supply of competent IT professionals

After discussing my project with senior officers of CEPIS, it was clear that they were very excited with the direction of my research and fully supported it as being beneficial to their organisation and to the IT industry in general. Based on their interest, they kindly agreed to send a letter of endorsement with the survey to selected computer societies (based on their knowledge of the most likely to respond). In return, I committed to sharing the results of the survey with the members of CEPIS by publishing in their journal (Upgrade).

Following is the endorsement of CEPIS of my research project and its strong relevance to IT Professionalism in Europe.

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[22] www.cepis.org
[23] CEPIS Council Meeting April 2000
[24] CEPIS Council meeting April 2002

Following from the Presidents meeting in Vienna last April, and consequent discussions by Council in Sofia in May, CEPIS Execom has taken action to focus attention and energy on a small number of initiatives that are considered to be of high importance by members. One such initiative is to take a leadership view in the area of IT Professionalism and the IT Professional Society.

We have been asked by a Doctoral student, Sean Brady, to assist with conducting a study into the area of Professionalism in IT. After speaking to Sean, and looking at his area of work, we find that Sean's study is directly in line with our initiative on Professionalism and the IT Professional. For this reason we have agreed to assist Sean Brady, and so ask you to lend your assistance too.

Sean has prepared a short survey (attached). Data from this survey will allow Sean to complete his analysis. The survey conclusions will be shared with CEPIS, and Sean has also agreed to publish results and analysis in Upgrade.

Can I please ask you to take a few minutes to complete and return the survey, either to myself or to Sean directly (his email address is in the attachment).

Thank you for your continued support and assistance

With kind regards,

Declan Brady
Honorary Treasurer
CEPIS

Survey content and format

The survey format is based on the dimensions of professionalism outlined in the previous section. In formatting the survey, it was necessary to ensure that its meaning was clear and concise as it was going to be filled out by non-native English speakers.

As the intention of the survey was to ascertain the maturity of the implementation of professionalism in the various countries, I adopted a scale approach to each of the questions enabling the respondents to give an answer within the range 0-10. However in order to calibrate the meaning of the scale, the survey questions contained descriptions of the ends and mid point of the scale. The intention of this was to give

clarity of meaning to the scale as well as trying to compensate for cultural differences in terms of self assessment markings. The mechanism also facilitated analysis and comparison of the survey results.

Below is an example of the question format.

Question 3:

On a scale of 0-10, how well defined is the level of knowledge required to be a member of your profession?

0=Undefined	5=Partially	10=Very well defined
No specific educational requirements required.	Educational standards defined perhaps with experience alternative. Often alternative educational standards accepted (e.g. non-IT related degrees)	Knowledge required is specified and controlled by the profession. Strict adherence to educational standards required

Table 9 Example Survey Question

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Pilot survey

Before conducting the survey, I conducted a pilot survey with the Irish Computer Society (a member of CEPIS) with the objective of ensuring the questions have clarity in terms of the question meaning and the scale description.

The feedback was invaluable in ensuring that the survey is well understood and the results were meaningful.

The initial survey is shown in the Appendix, but we will address the feedback from the pilot survey in this section. Comments were received in relation to 4 questions (questions 1,2,12 and 14) which will be discussed below along with their reworked solution.

Question 1:

Understanding and clarity of a profession's jurisdiction is important for any professional body. The objective of this question was to test the clarity of the jurisdiction of the Computer Society in the various countries, i.e. what constitutes the 'scope' or jurisdiction of the professional body, what is in and what is out of its scope.
The initial format of this question is shown below.

Initial Question:

On a scale of 0-10, how well defined are the members of your Computer Society ?

Comment: What do you mean here? Some societies have membership grades (which would be clearly defined, but would not correspond with IT job roles), whereas others do not. Some societies will attempt to record data about a persons professional role, but others do not. I think you may not be asking the right question here?

0=Undefined	5=Partially	10=Very well defined
Members generally employed in IT. No specific categories of roles defined.	Members employed in the IT industry. Broad categories of Job roles defined, e.g. Software Engineer, IT Architect, Technical Support	Clear roles and responsibilities of members. Clear job, process and task definition for all members in society.

Table 10 Question 1 (Pilot Survey)

It seems from the feedback to the question that the wording was confusing and that some Computer Societies might think that the question referred to job roles within the profession as to the referring to the jurisdiction of the profession itself.
As this was an important question (and the first), I decided to reword both the question and answer scale to strengthen the meaning of what I wanted to find out. By using the words jurisdiction and scope and being clearer in what I was looking for helped provide a clearer and stronger question. The reworked question is shown below.

Reworked Question

On a scale of 0-10, how well defined is the scope or jurisdiction of your Computer Society?

0=Weak	5=Partially	10=Very well defined
Scope is people generally working in IT	Scope is defined as specific job roles within the IT industry e.g. Software Engineer, IT Architect, Technical Support, etc.	Scope is defined as only certain job roles, processes and tasks within the IT Industry. There is clarity as to what roles are in or out of the scope of your Society.

Table 11 Question 1 (Revised)

Question 2:

The purpose of this question is to examine lines of demarcation between the IT profession and other professional bodies. By understanding how strong these lines of demarcation are in each country will help us further understand the jurisdiction and clarity of scope of the profession. The feedback to the initial version of the question suggested a potential misunderstanding of meaning between the professional him/herself and the professional organisation. The question was revised in favour of the relationships between professional associations. See initial and reworked question below.

Initial Question

On a scale of 0-10, how well defined is the relationship your members have with other professions ?

Comment: This would be anecdotal, at best. Perhaps better to ask how well defined the relationship is between the society and other professional sofieties?

0=Undefined	5=Partially	10=Very well defined
Unclear relationship between members and other professionals, e.g. Engineers, Accountants, etc.	General agreement and understanding of roles. No formal agreement or understanding in place.	Clarity of responsibilities and demarcation between IT Professionals and other Professions. For example agreement/understanding in place.

Table 12 Question 2 (Pilot Survey)

Reworked Question

On a scale of 0-10, how well defined is the relationship your society has with other professional societies?

0=Undefined	5=Partially	10=Very well defined
Unclear relationship between members and other professionals organisations, e.g. Engineers, Accountants, etc.	General agreement and understanding of roles. No formal agreement or understanding in place.	Clarity of responsibilities and demarcation between IT Professionals and other Professional organisations, for example agreement/understanding in place.

Table 13 Question 2 (Revised)

Question 12:

The purpose of question 12 was to ascertain how the core value of the IT profession was understood and accepted by customers of the profession. Knowing what a professional association stands for and the value it gives to its customers is a fundamental part of the profession and helps determine its place within society.

The initial question is shown below.

Initial Question

On a scale of 0-10, How clear is your core value definition understood by customers?

Comment: I think you will need to explain what you mean by "core value definition" and also clarify what you mean by "customers".

0=Weak	5=Partially	10=Strong
Unclear understanding of core value definition of profession by customers.	Multiple and often conflicting value definitions of profession understood by customers.	Strong clarity of core value provided by members

Table 14 Question 12 (Pilot Survey)

It was clear from the feedback to the initial question that there was confusion as to what I meant by 'core value' as well as who the customers of the profession are. This feedback didn't surprise me as one of my observations from the literature on IT Professionalism suggested that the value that IT professionals bring to customers is inconsistent and somewhat unclear. However, I wanted to explore it further and decided to seek more input from the respondents as well as given clarity as to what information I was looking for.

I decided to split the question into two parts 12a) and 12b). The first part of the question explored the 'core value' of the IT profession. Given the perceived fuzzyness of this statement, I decided to give example of core values from other professions as a prompt to the Computer Societies as to the type of information I am looking for. The Computer Societies were then free to give their understanding of their core value.
This information in itself will enable a fuller discussion and analysis in the results section of the value of an IT profession.

The second part of the question was also changed to remove the confusion as to who the customer was. My intention was to examine the value that the IT profession brings to society (in general) and the IT industry. The perceived value of the IT profession in society may have an impact on its professional status as described in earlier sections.

The reworked question 12 will provide more relevant feedback and the splitting into two sections helps the meaning and understanding of what I am looking for.
The reworked question is shown below.

Reworked Question

Consider the table below giving examples of the core value of other professional bodies:

Profession	Core Values
Clergy	Holiness, spiritual healing, confidentiality, high morals
Medical	Health protection and healing, ethical oath
Accountants	Ethical, independent auditors, financial management
Architect	Design innovation
Police	Protection of life and property
Lawyers	Administration of Law and order, administration of justice
Engineers	Design and build

Table 15 Question 12 (Core Values)

Question 12a) What do you consider the core value of members of your Computer Society is?

Answer 12a): _____

Question 12b) On a scale of 0-10, how well is this core value understood by industry and society?

0=Weak	5=Partially	10=Strong
Unclear understanding of core value of members of Computer Society.	Multiple and often conflicting core values of members of your Computer Society understood by industry and society.	Your Society's core value is clearly understood by industry and society.

Table 16 Question 12 (Revised)

Answer 12b (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 14:

There was a minor change made to this question to clarify the meaning of the question. Following the pilot survey, the respondent read into it that the Computer Society was providing a career path for its members. The suggested wording change added clarity that the professional organisation provided models for career paths rather than career paths itself. This change was accepted and made, see initial and reworked questions below.

Initial Question

On a scale of 0-10, What level of career path do you provide for your members?

Comment: Again, clarify: presumably you mean models of career paths?

0=Weak	5=Partially	10=Strong
None, no focus on developing member's careers.	Partially, advice and guidance but not actively promoted or encouraged.	Strong, clearly defined career path with requirement and standards defined at each stage.

Table 17 Question 14 (Pilot Survey)

Reworked Question

On a scale of 0-10, what level of career path models do you provide for your members?

0=Weak	5=Partially	10=Strong
None, no focus on developing member's careers.	Partially, advice and guidance but not actively promoted or encouraged.	Strong, clearly defined career paths with requirements and standards defined at each stage.

Table 18 Question 14 (Revised)

Survey Sample

The objective of the project is to develop a model of IT Professionalism and then compare a sample set of European Computer Societies against this model to understand how the current implementations of professionalism is implemented and to suggest actions to the stakeholders if appropriate.

With the support and knowledge of CEPIS, I selected a number of computer societies to survey. These societies provided a good representation of IT professionals in Europe as well as the ones most likely to respond (based on knowledge of CEPIS). The initial objective was to obtain feedback from a representative 6-8 Computer Societies across Europe. Assuming a response rate of 50%, the sample size was selected as 15.

The societies selected for survey are shown below with the resultant completion status.

Country	Survey Status
UK	Completed
Germany	Completed
Sweden	Completed
Norway	Completed
NL	Completed
Switzerland	Completed
Estonia	Completed
Ireland	Completed
Slovenia	Completed
Poland	Completed
Spain	Completed
Turkey	Completed
Denmark	No Response
Italy	No Response
Romania	No Response

Table 19 Countries surveyed

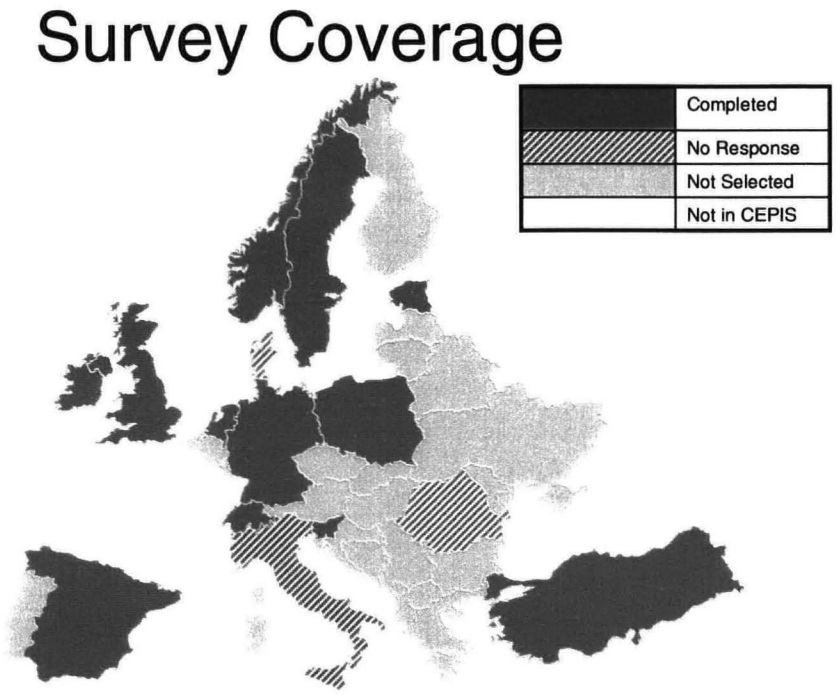


Table 20 Survey Coverage Map

Some notes on the Survey completion:

- Survey sent to 15 Computer Societies as representative of the European IT population
- The survey was completed by 12 societies given a return rate of 80%
- The surveys were completed by an Officer of the relevant Computer Societies and represent their opinion of the answers with respect to their own society rather than an agreed view of all board members.
- The duration of the survey was one month, with a follow-up chaser (email) after 3 weeks.
- France is not a member of the CEPIS and as they do not consider that they have an appropriate Computer Society, hence the survey was not sent to them.
- Most of the respondents showed great interest in the survey and are looking forward to receiving feedback on the responses.

Survey Results

Survey results were received from 12 country Computer Society organisations in Europe. In this section the results are analysised and discussed in order to understand how the countries fare against the dimensions of professionalism described in the Professional Model in the previous chapter.

The results will be discussed as follows :

- **Country feedback.** This section will discuss the direct feedback from the country Computer Society organisations and plot them on the scale for each dimension.
- **High and Lows.** In this section we will look at the extremes of the results, i.e. the questions with answers either at the low (ratings 0-2) or High (ratings (8-10) ends of the scale.
- **Dimension comparison.** Looking at each dimension across all survey results will identify overall trends and highlight organisations that consider themselves high in this dimension. A follow on study could then look at learning from these organisations.
- **Core Value.** The question on identifying the professional organisations core value and its relevance and acceptance by society is an interesting question to analyse separately as it is the only question which gave the computer societies the opportunity to explain what they see as their core value.
- **Overall Europe perspective.** Putting all the survey results together will give us an overall European view of how professionalism is implemented and will be the basis for developing suggested actions for stakeholders in the next section.

Country Feedback

In this section we will briefly discuss the feedback from the individual Computer Society organisations. The following table summarises the survey results received from each country and will be referred to during the country feedback analysis.

Survey Summary													
Question	Major Dimension	Minor Dimension	1 Estonia	2 NL	3 Norway	4 Ireland	5 Slovenia	6 Germany	7 Switzerland	8 Sweden	9 UK	10 Turkey	11 Poland	12 Spain
Q1	Jurisdiction	Jurisdiction	1	3	0	5	2	1	0	0	8	5	10	3
Q2		Interrelationship with other professions	10	7	7	5	9	5	0	4	8	7	10	4
Q3	Knowledge	Level of knowledge	1	3	0	7	6	2	0	0	9	6	10	5
Q4		Entry Level	0	2	0	6	2	10	0	0	4	2	10	2
Q5		Acadamic relationship	5	5	5	5	4	8	1	2	9	8	5	2
Q6		Industrial Relationship	5	5	10	6	5	10	0	1	5	7	5	6
Q7	State Relationship	Monopoly	0	0	0	1	0	10	0	0	5	4	0	5
Q8		Licencing	1	4	0	0	1	7	0	0	2	1	10	0
Q9		Influence on State	10	5	7	4	2	10	5	2	5	7	6	4
Q10		Self Regulatory	1	3	0	4	1	1	0	5	7	2	6	4
Q11	Customer Value	Ethics	7	4	8	7	9	0	7	5	8	7	4	4
Q12		Core Value	0	8	10	5	7	9	5	2	6	7	3	6
Q13		Trust and responsibility	6	6	9	5	8	10	5	5	6	7	6	8
Q14	Membership Value	Career Path models	2	4	8	8	1	10	6	2	7	5	3	5
Q15		Professional Support	7	3	8	2	1	8	6	1	8	7	6	4
Q16		Continuous Learning	5	5	9	6	0	6	7	0	6	5	3	6

Table 21 Survey Summary

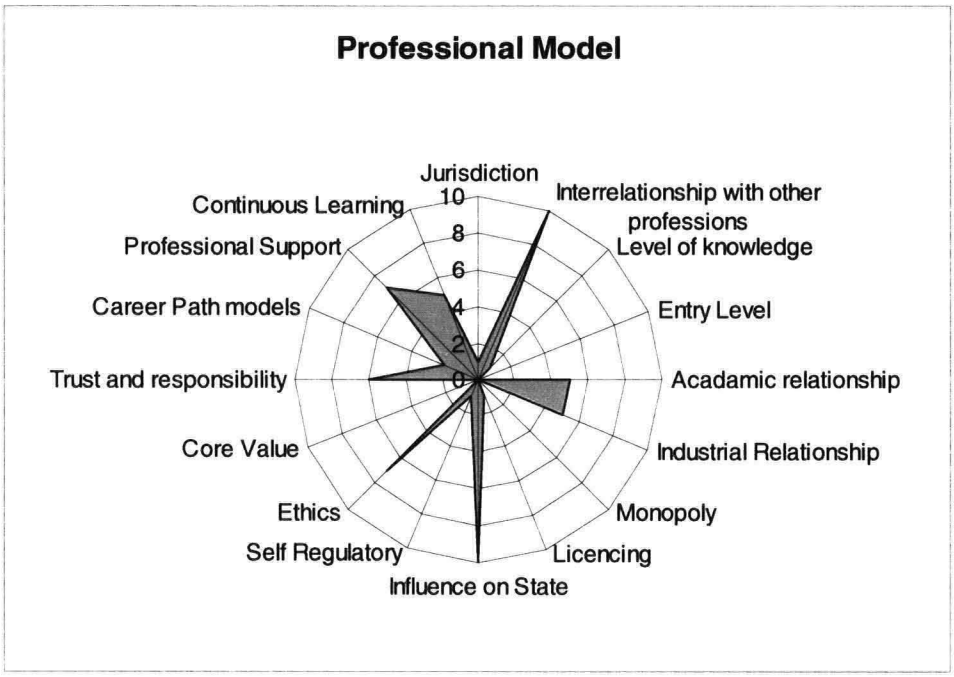
Estonia

Name of Computer Society: Estonian Information Technology Society

Survey Completed by: Jaan Oruaas

Position in Society: Chairman

IT Industry: Population of approximately 1.5m with 7000 employed in the IT Services sector in 970 enterprises representing a turnover of nearly €700m. (Source: Information Society statistics (1997-2002), European Commission).



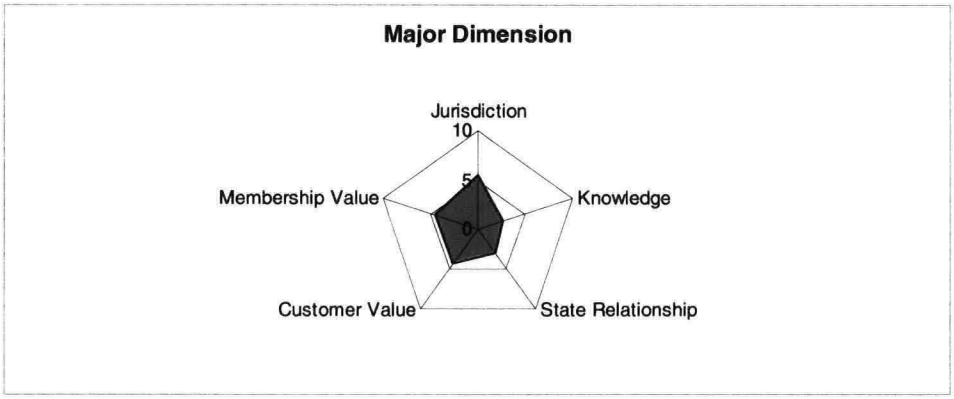


Figure 14 Estonia Professional Model

Overall Estonia's results show a number of dimensions where they rate themselves very highly (Inter-relationships with other professions, Influence on State) while for other dimensions (Jurisdiction, Level of Knowledge, Entry Level, Monopoly, Licensing, Self Regulatory, Core Value, Career Path Models) they rate themselves weakly. The remaining dimensions (Academic Relationship, Industrial Relationship, Ethics, Trust and Responsibility, Professional Support and Continuous Learning) are generally rated in or around the middle of the scale.

Its core value relates mainly to benefits to members of the society is clearly not valued and understood by industry and society with a scale of 0.

The Netherlands

Name of Computer Society: NGI, Dutch Computer Society

Survey Completed by: Hans Frederik

Position in Society: Board member

IT Industry: Population of approximately 8m with 280,000 employed in the IT Services sector in 22,000 enterprises representing a turnover of €6,000m. (Source: Information Society statistics (1997-2002), European Commission).

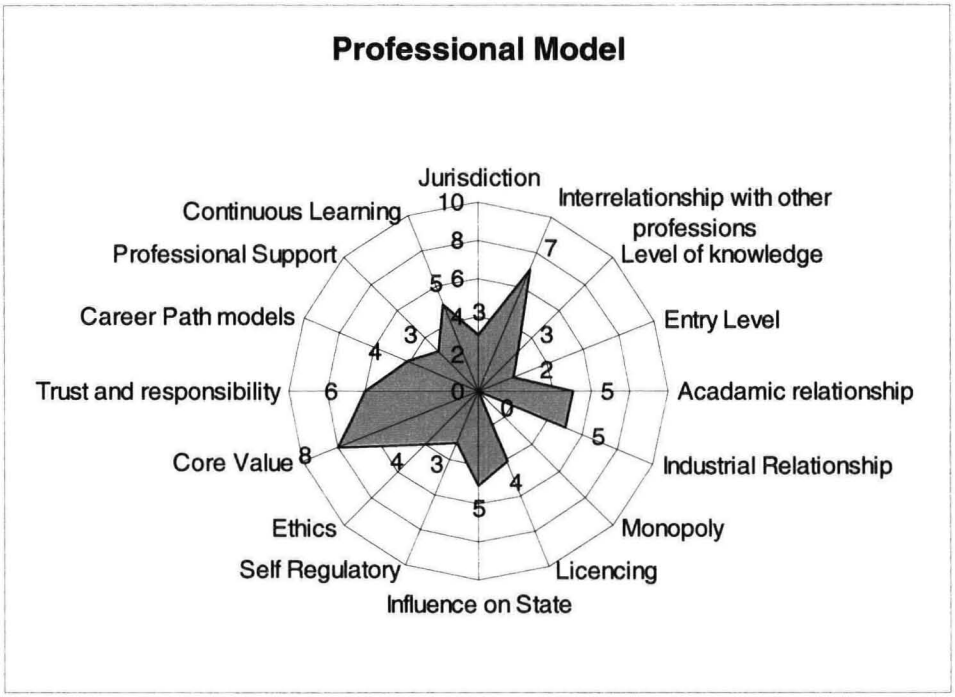


Figure 15 The Netherlands Professional Model

The Netherlands results are generally fair across all dimensions with the exception of the monopoly dimension. Its core value is generally well understood by industry and society.

Norway

Name of Computer Society: Den Norske Dataforening

Survey Completed by: Renny B. Amundsen

Position in Society: CEO in EUCIP Norge as (Ltd.)

IT Industry: Population of approximately 4.5m with 83,000 employed in the IT Services sector in 11,000 enterprises representing a turnover of €24,000m. (Source: Information Society statistics (1997-2002), European Commission).

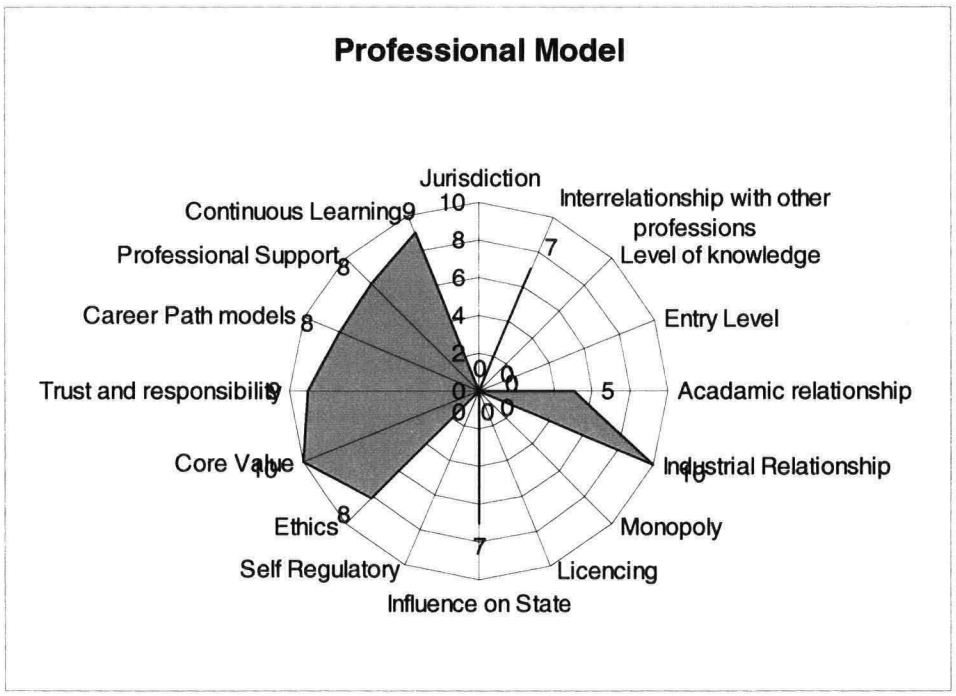
Norway

Name of Computer Society: Den Norske Dataforening

Survey Completed by: Renny B. Amundsen

Position in Society: CEO in EUCIP Norge as (Ltd.)

IT Industry: Population of approximately 4.5m with 83,000 employed in the IT Services sector in 11,000 enterprises representing a turnover of €24,000m. (Source: Information Society statistics (1997-2002), European Commission).



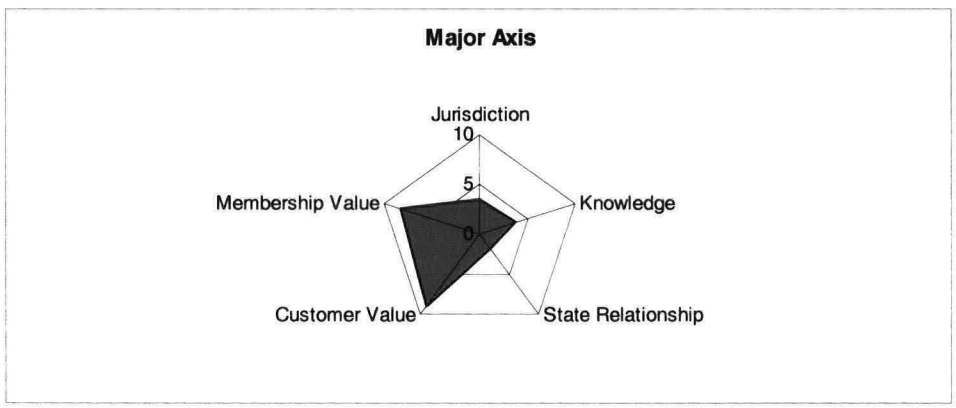


Figure 16 Norway Professional Model

Norway's strength is in its Membership value and Customer value major dimensions. It score very highly in all sub-dimensions in these categories, but is generally weak in all other dimensions with the exception of relationships with industry and academia.

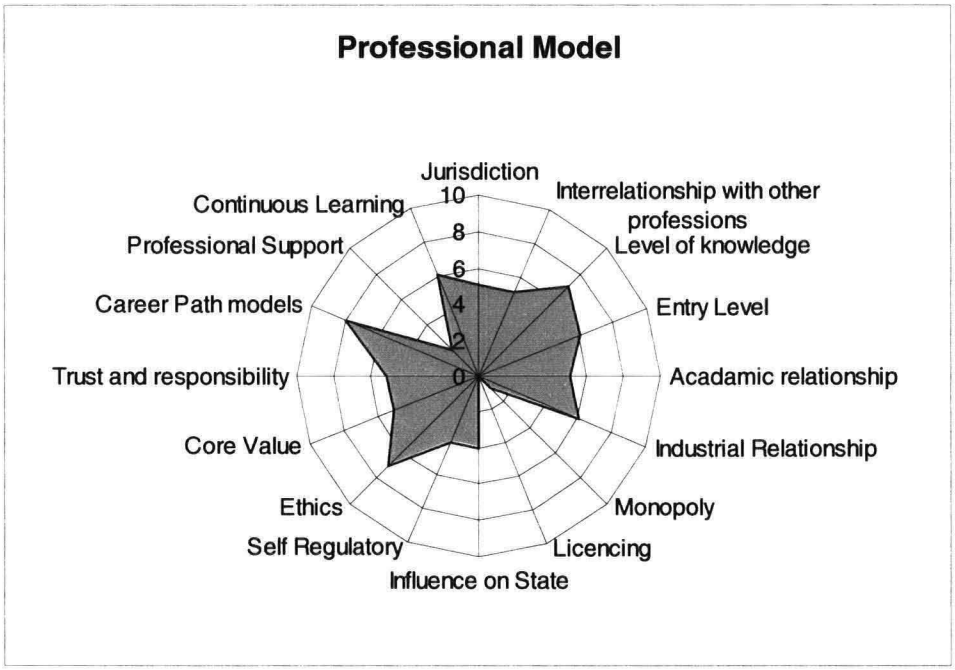
Ireland

Name of Computer Society: Irish Computer Society

Survey Completed by: Declan Brady

Position in Society: President

IT Industry: Population of approximately 3.8m with 30,000 employed in the IT Services sector in 2,600 enterprises representing a turnover of €11,500m. (Source: Information Society statistics (1997-2002), European Commission).



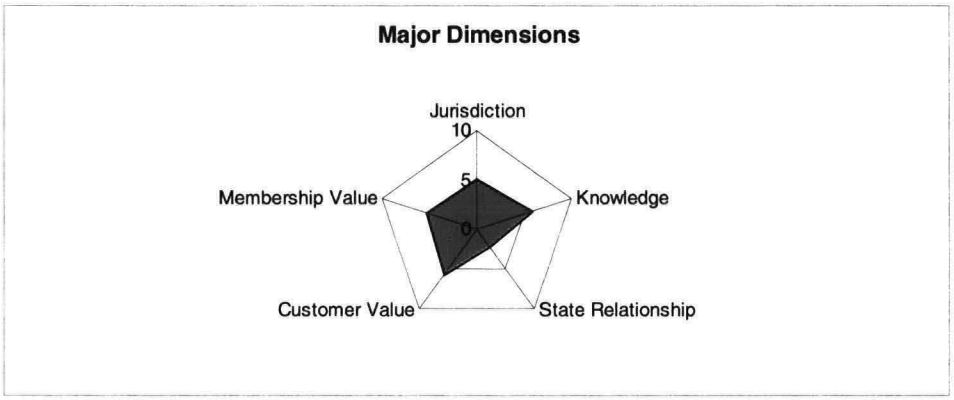


Figure 17 Ireland Professional Model

Ireland shows a moderately strong rating along most dimensions. They rank themselves midway for most of the dimensions with the exception of monopoly and professional support. Its weakest major dimension is in the area of State Relationship

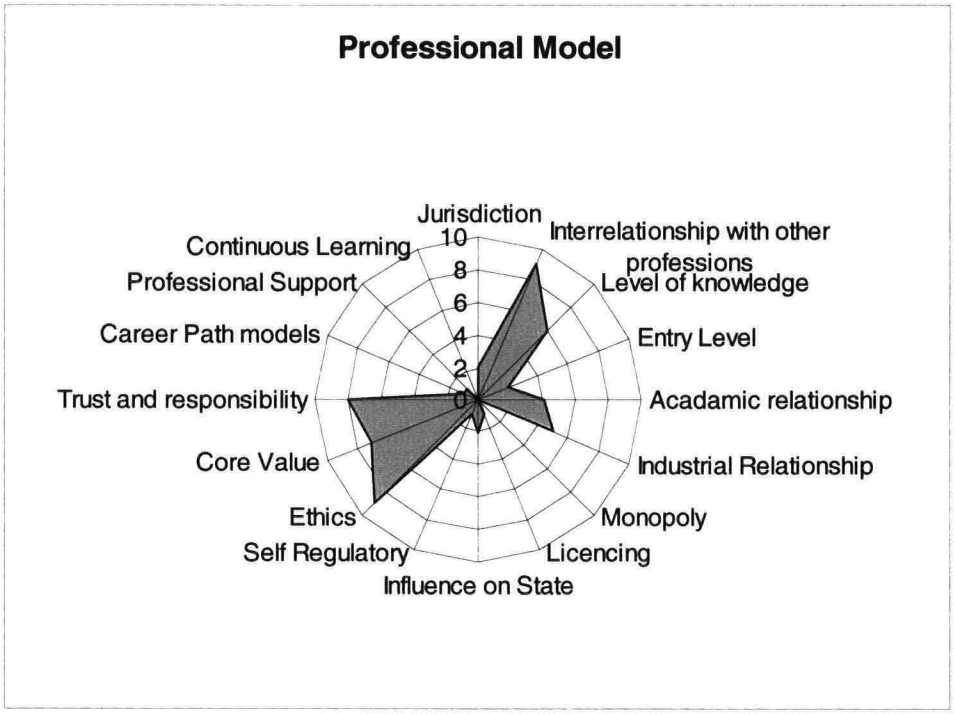
Slovenia

Name of Computer Society: Slovenian Society INFORMATIKA

Survey Completed by: Niko Schlamberger

Position in Society: President

IT Industry: Population of approximately 2m with 2,000 enterprises in the IT Services representing a turnover of €1,300m. (Source: Information Society statistics (1997-2002), European Commission).



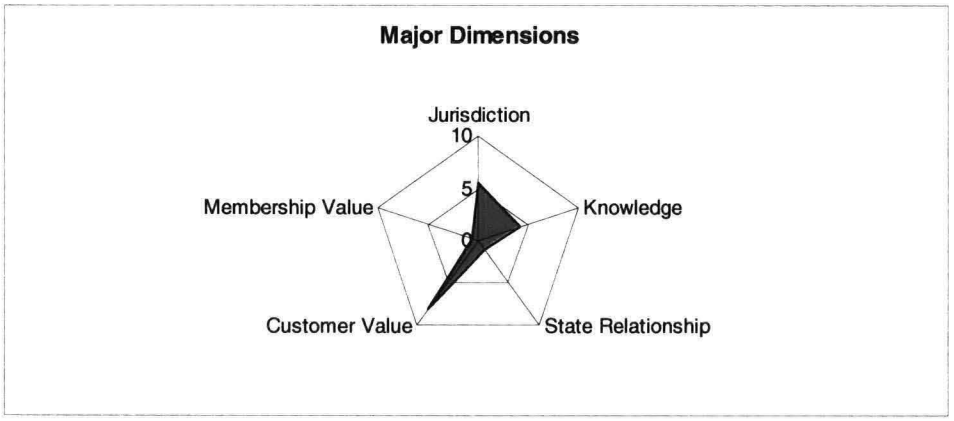


Figure 18 Slovenia Professional Model

Slovenia results are dominated by strong interrelationships with other professions and the set of dimensions representing customer value (Trust and responsibility, core value and ethics). All other dimensions score weakly.

Germany

Name of Computer Society: Information Technology Society within VDE

Survey Completed by: Volker Schanz

Position in Society: General Manager

IT Industry: Population of approximately 80m with 580,000 employed in the IT Services sector in 61,000 enterprises representing a turnover of €172,380m. (Source: Information Society statistics (1997-2002), European Commission).

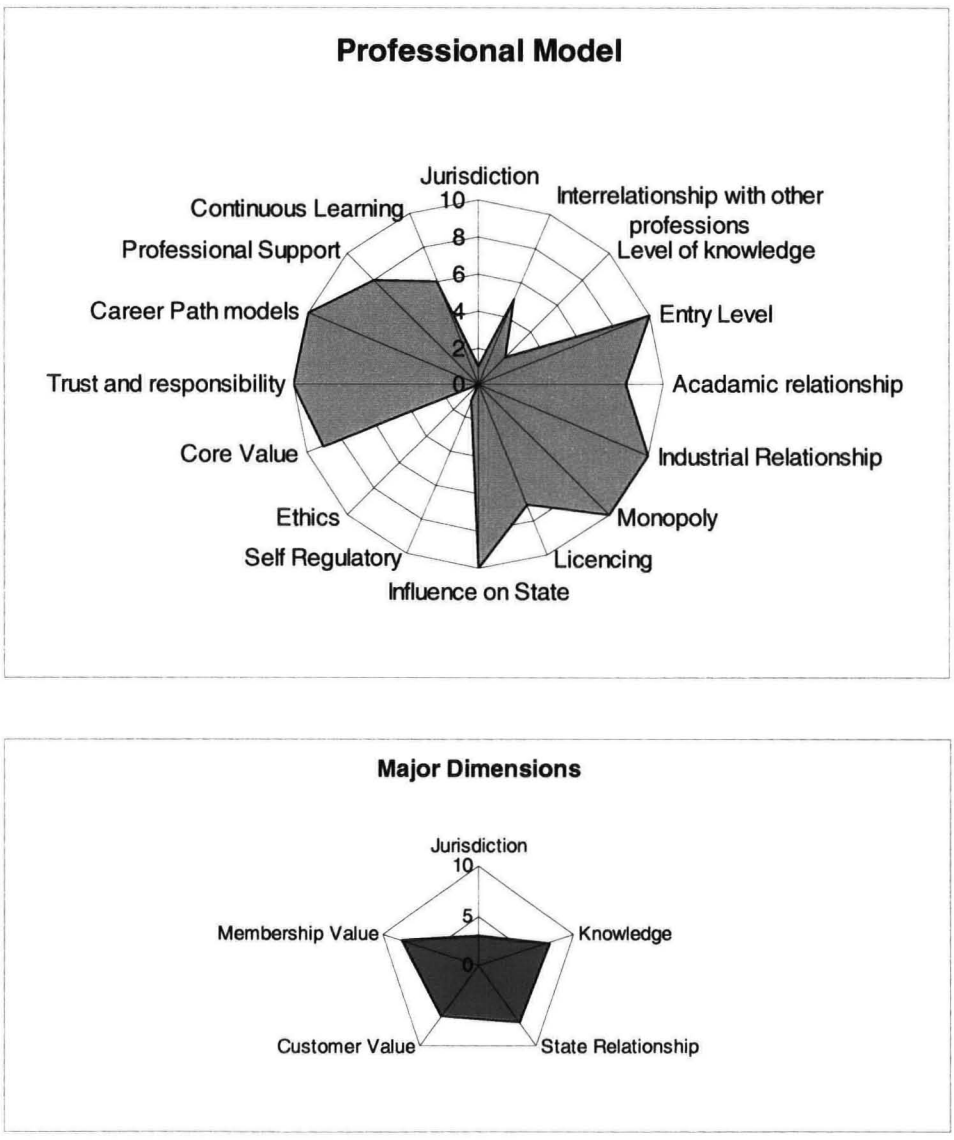


Figure 19 Germany Professional Model

Germany has returned one of the strongest results in Europe in relation to its self assessment against the dimensions. Ratings are very strong in the major dimensions of Knowledge, State Relationship, Customer Value and Membership Value) but weak in the areas of Jurisdiction, ethics and self regulation.

Switzerland

Name of Computer Society: Swiss Informatics Society

Survey Completed by: Jorg Ruegg

Position in Society: Treasurer

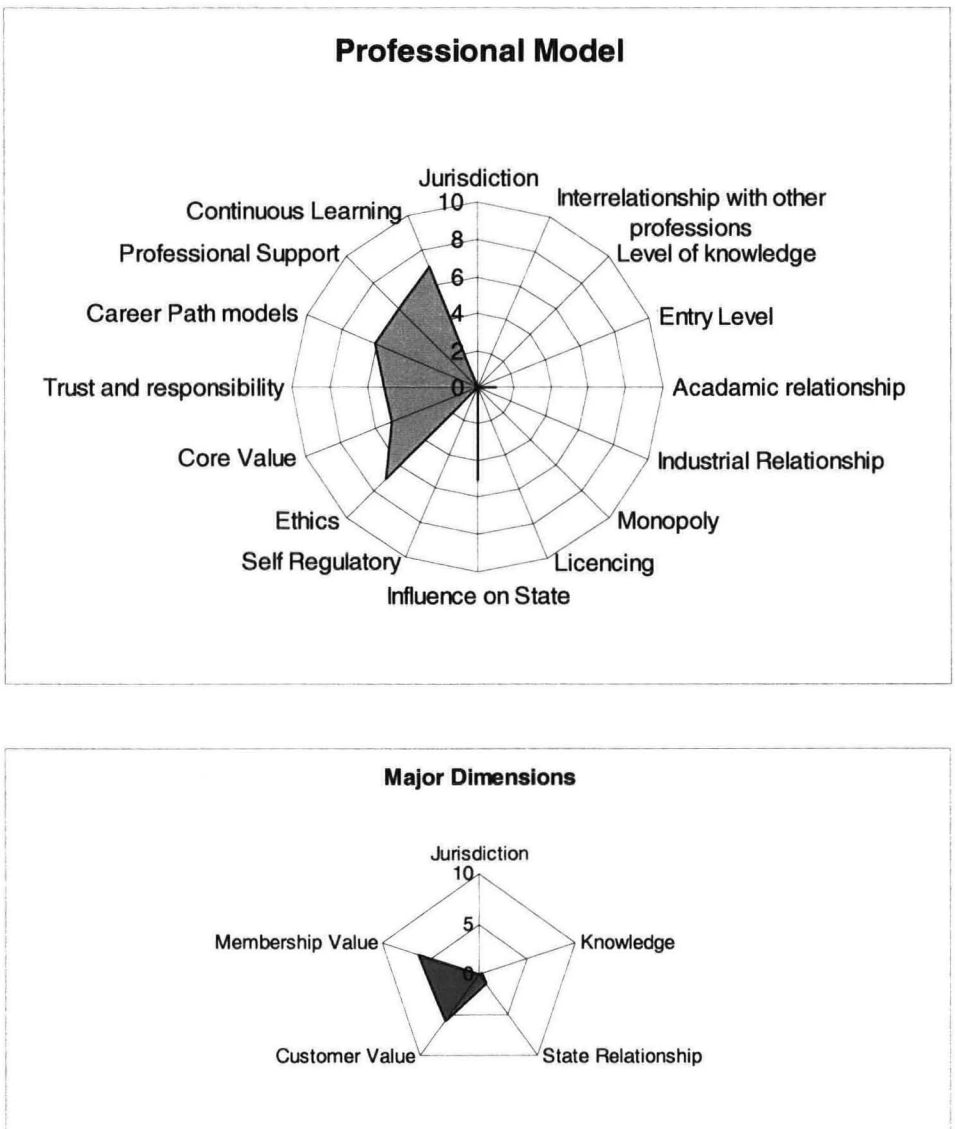


Figure 20 Switzerland Professional Model

Switzerland rates itself very poorly against the majority of the dimensions with the exception of some minor dimensions in Membership and Customer value.

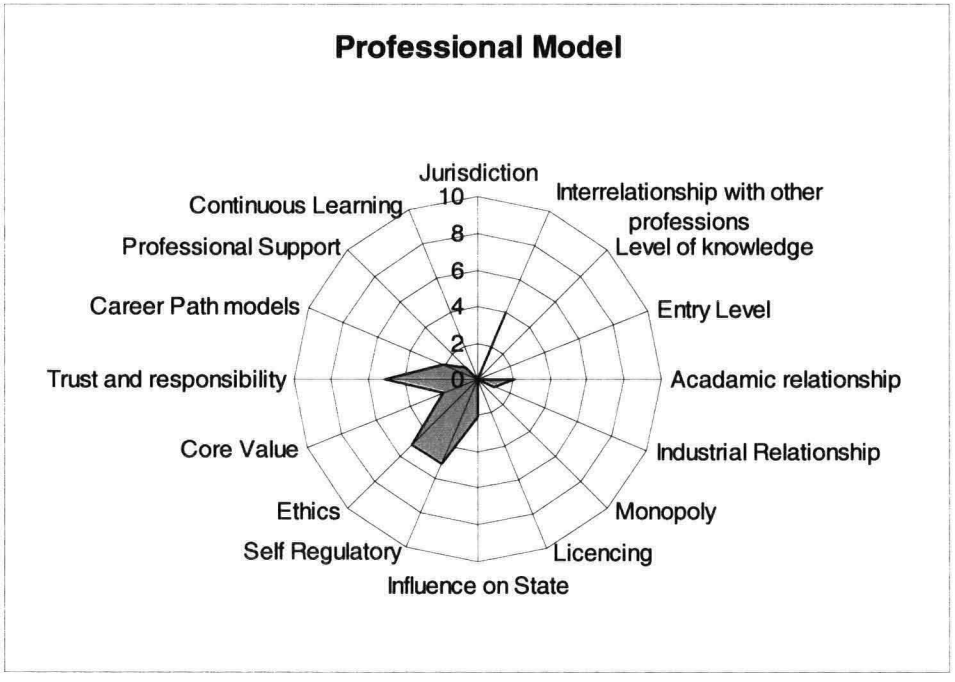
Sweden

Name of Computer Society: Swedish Computer Society

Survey Completed by: Rolf Berndtson

Position in Society: President

IT Industry: Population of approximately 8.9m with 208,000 employed in the IT Services sector in 32,685 enterprises representing a turnover of €49,660m (Source: Information Society statistics (1997-2002), European Commission).



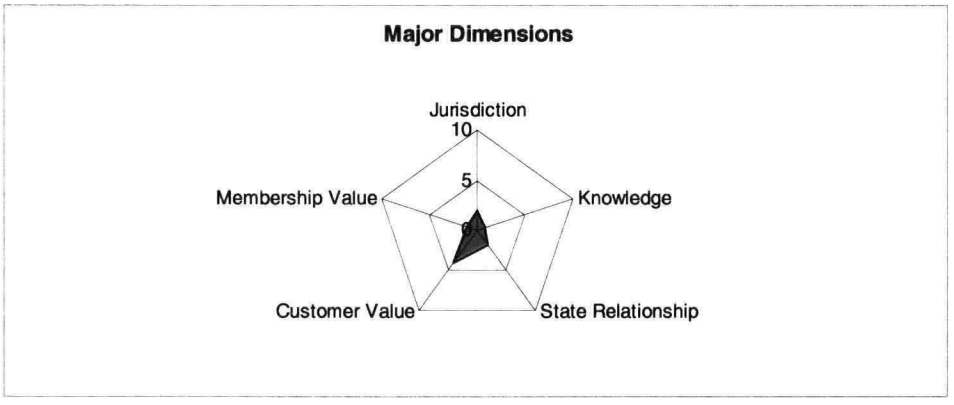


Figure 21 Sweden Professional Model

Sweden rates itself generally very weak in all dimensions with mediocre ratings in the area of Customer Value.

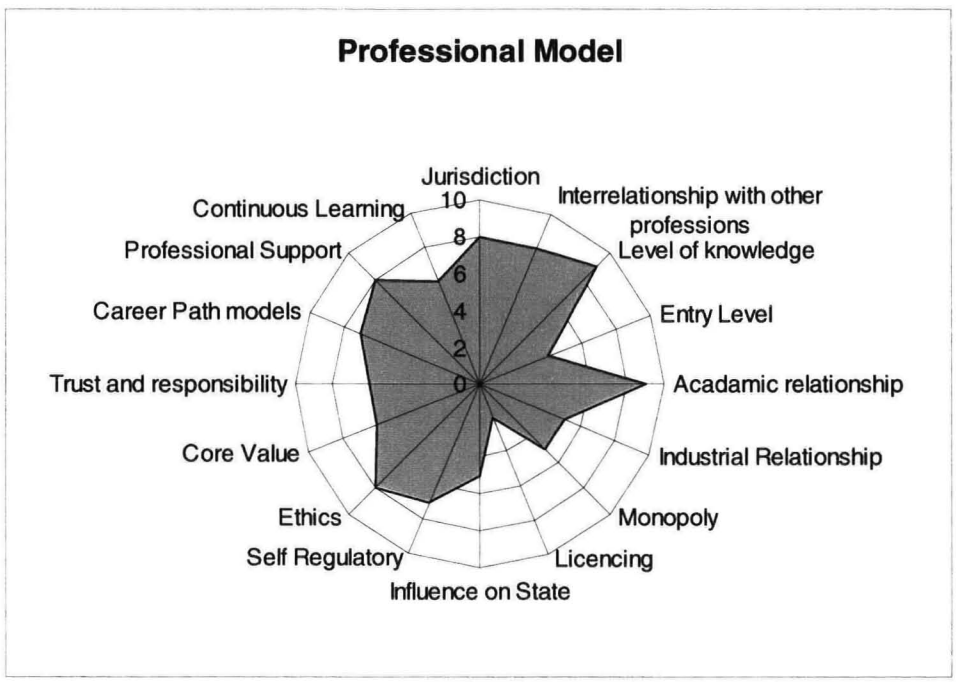
UK

Name of Computer Society: British Computer Society

Survey Completed by: John Chapman

Position in Society: Member

IT Industry: Population of approximately 60m with 1,1m employed in the IT Services sector in150,000 enterprises representing a turnover of €258,470m (Source: Information Society statistics (1997-2002), European Commission).



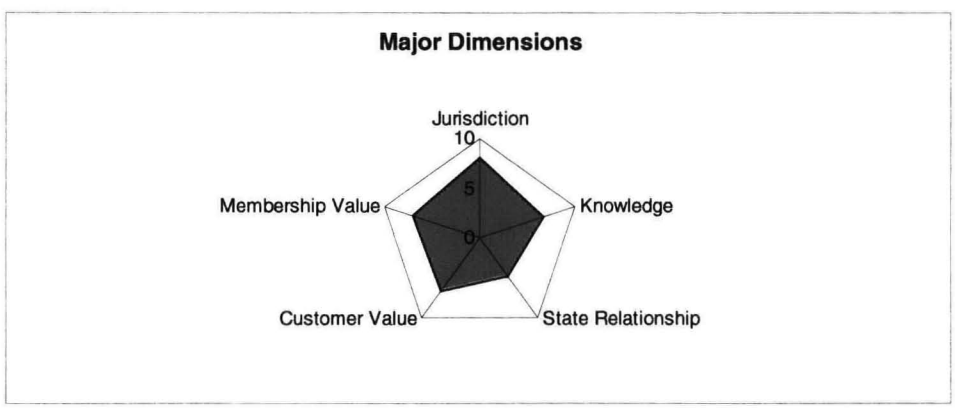
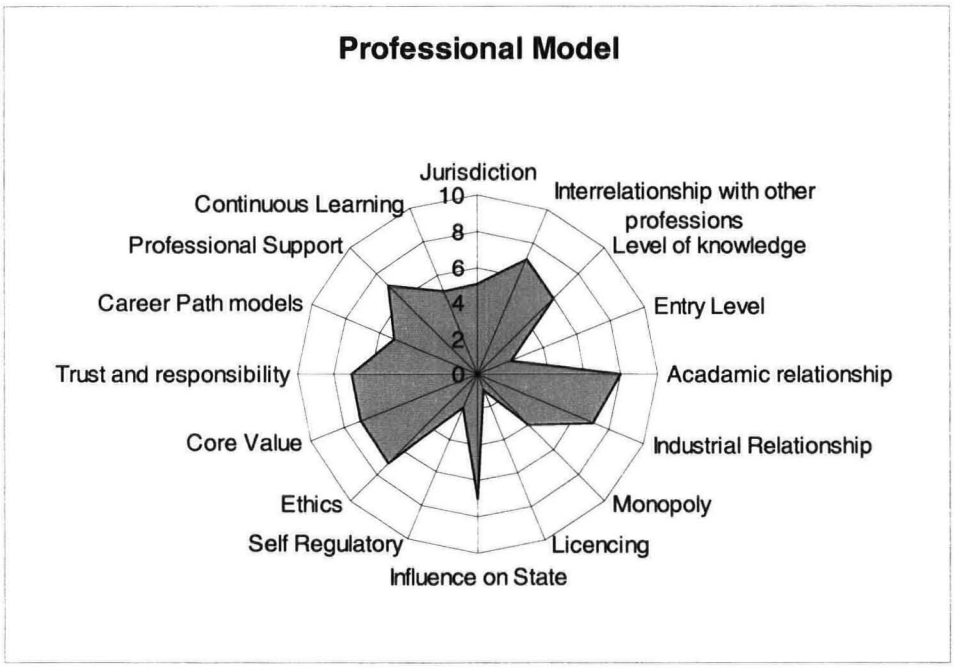


Figure 22 UK Professional Model

The UK (like Germany) has one of the strongest results of the survey rating itself highly in most of the dimensions. The area of weakness is mainly related to the major dimension of State Relationship (Licensing, Monopoly and Influence on the State).

Turkey

Name of Computer Society: Informatics Association of Turkey
Survey Completed by: Byron Nicolaides
Position in Society: Member



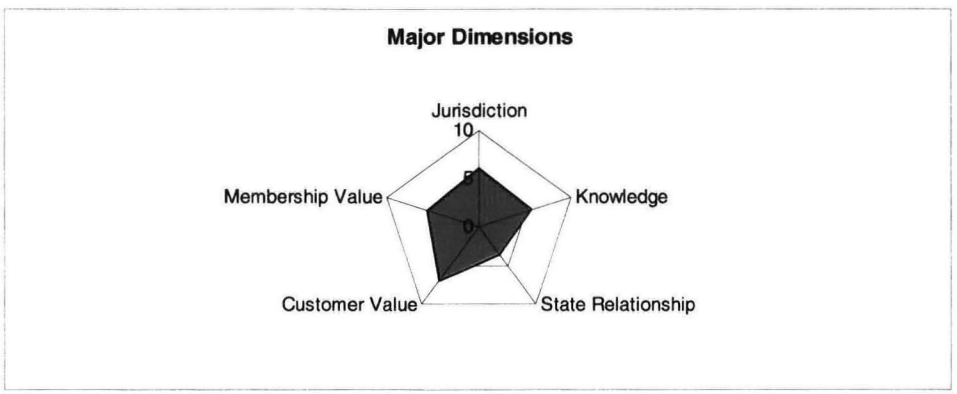
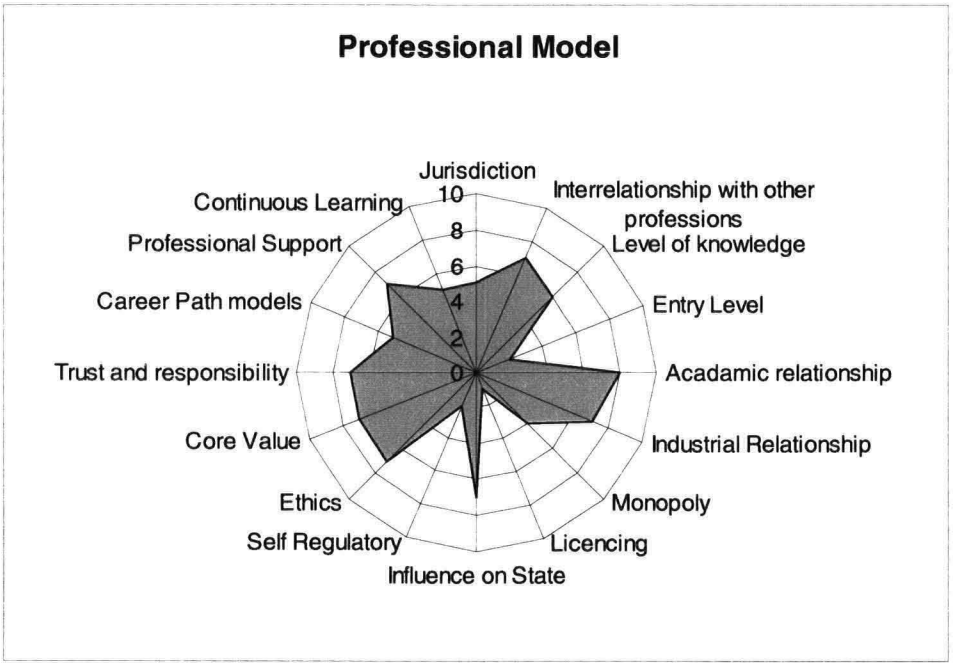


Figure 23 Turkey Professional Model

Turkey is reasonably strong in its assessment across the dimensions. Generally mediocre ratings in most dimensions with the exception of Entry Level knowledge, Licensing and Self Regulation.



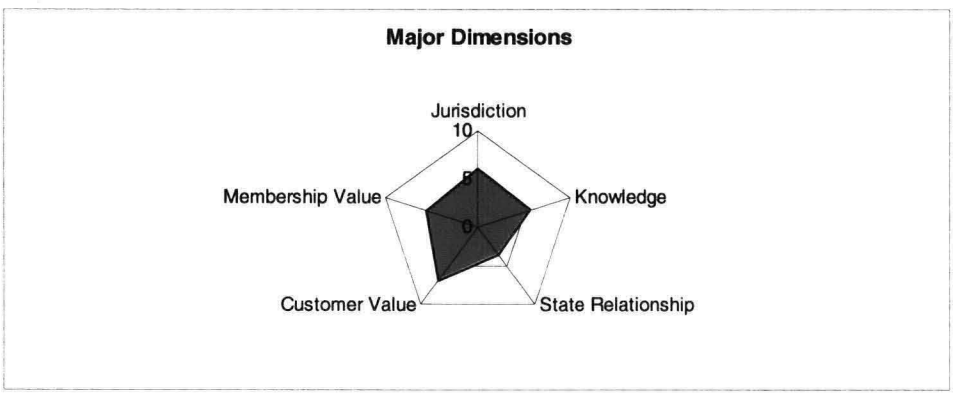


Figure 23 Turkey Professional Model

Turkey is reasonably strong in its assessment across the dimensions. Generally mediocre ratings in most dimensions with the exception of Entry Level knowledge, Licensing and Self Regulation.

Poland

Name of Computer Society: Polish Information Processing Society

Survey Completed by: MKI

Position in Society: Member of the Board

IT Industry: Population of approximately 38m with 24,500 IT enterprises representing a turnover of €6700m (Source: Information Society statistics (1997-2002), European Commission).

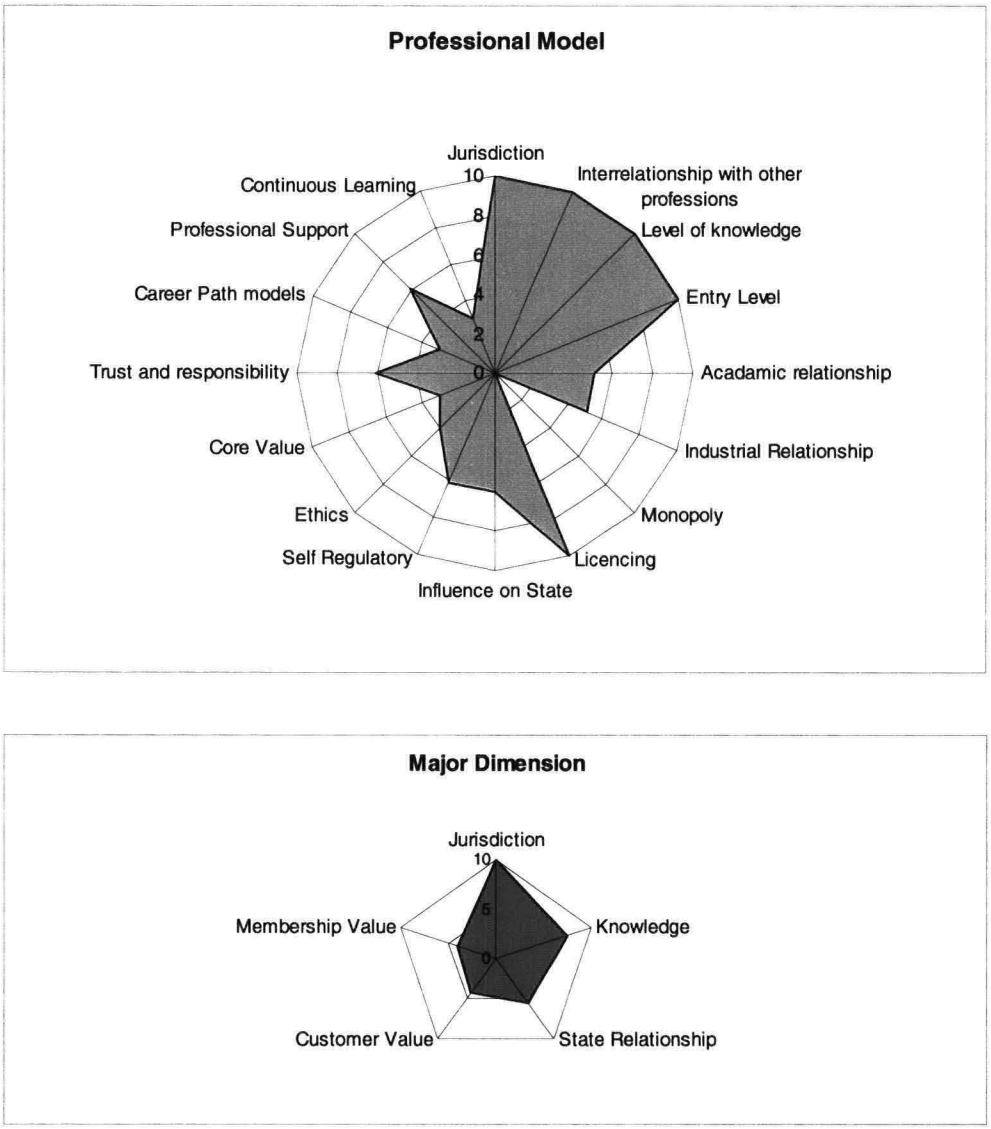
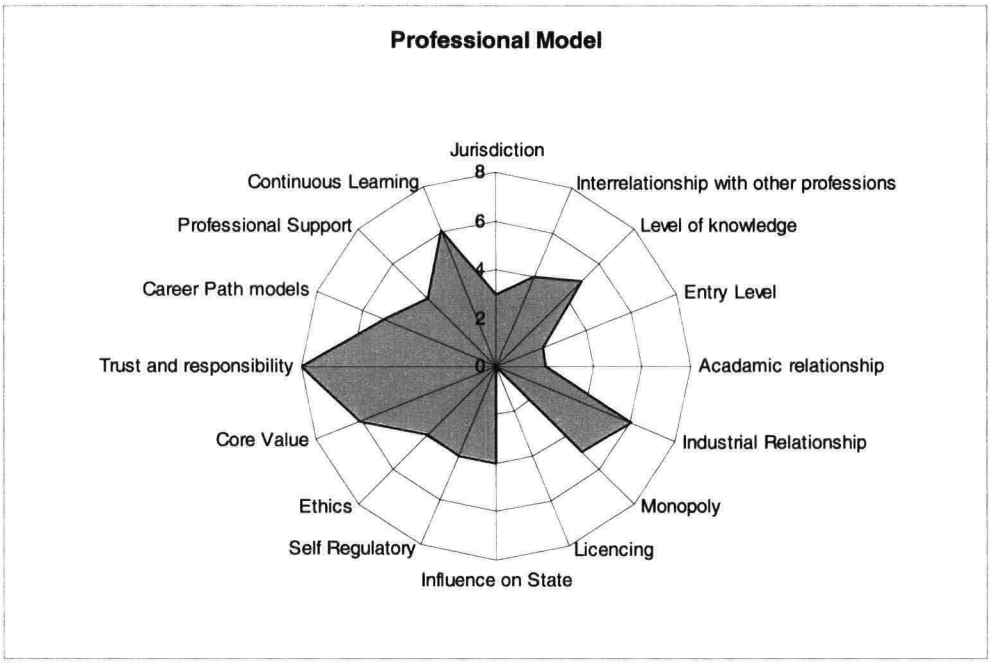


Figure 24 Poland Professional Model

Poland stands out with the highest ratings in the Jurisdiction major dimension (only country scoring a rating of 10 in both minor dimensions in Jurisdiction and Interrelationship with other professions. It also scored the highest ratings in Level of Knowledge and Entry Level within the Knowledge major dimension. Poland was also the only country to score a 10 in Licensing. In many instances Poland has shown significant differences with many other countries that have completed the survey.

Spain

Name of Computer Society: Polish Asociación de Técnicos de Informática –ATI
Survey Completed by: Vice President
IT Industry: Population of approximately 40.4m with 360,000 employed in the IT Services sector in 37000 enterprises representing a turnover of €80100m (Source: Information Society statistics (1997-2002), European Commission).



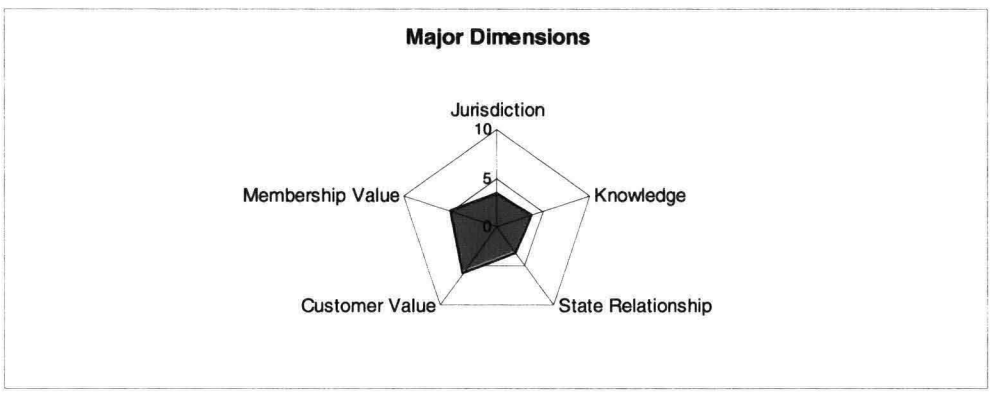


Figure 25 Spain Professional Model

Spain follows the pattern of most of the other countries with mediocre scores in many of the dimensions.

Highs and Lows

It is interesting to examine the survey results that returned either high (8-10) or low ratings (0-2) to see if any messages or lessons can be extracted from this data. Interestingly the number of responses with a high rating account for 19% of the total scores while the number of responses with a low rating is substantially more at 32% with respect to the Professional Model dimensions being tested; so there is clearly room for improvement.

Survey Summary - Highs														
			1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
Question	**Major Dimension**	**Minor Dimension**	**Estonia**	**NL**	**Norway**	**Ireland**	**Slovenia**	**Germany**	**Switzerland**	**Sweden**	**UK**	**Turkey**	**Poland**	**Spain**
Q1	Jurisdiction	Jurisdiction	1	3	0	5	2	1	0	0	8	5	10	3
Q2		Interrelationship with other professions	10	7	7	5	9	5	0	4	8	7	10	4
Q3	Knowledge	Level of knowledge	1	3	0	7	6	2	0	0	9	6	10	5
Q4		Entry Level	0	2	0	6	2	10	0	0	4	2	10	2
Q5		Acadamic relationship	5	5	5	5	4	8	1	2	9	8	5	2
Q6		Industrial Relationship	5	5	10	6	5	10	0	1	5	7	5	6
Q7	State Relationship	Monopoly	0	0	0	1	0	10	0	0	5	4	0	5
Q8		Licencing	1	4	0	0	1	7	0	0	2	1	10	0
Q9		Influence on State	10	5	7	4	2	10	5	2	5	7	6	4
Q10		Self Regulatory	1	3	0	4	1	1	0	5	7	2	6	4
Q11	Customer Value	Ethics	7	4	8	7	9	0	7	5	8	7	4	4
Q12		Core Value	0	8	10	5	7	9	5	2	6	7	3	6
Q13		Trust and responsibility	6	6	9	5	8	10	5	5	6	7	6	8
Q14	Membership Value	Career Path models	2	4	8	8	1	10	6	2	7	5	3	5
Q15		Professional Support	7	3	8	2	1	8	6	1	8	7	6	4
Q16		Continuous Learning	5	5	9	6	0	6	7	0	6	5	3	6

Table 22 Survey Summary – Highs

With regard to the High results, 4 countries stand out as dominant, Germany, Norway, UK and Poland. These 4 country organisations alone account for three quarters of all the high ratings and show the greatest maturity with respect to the professional model.
No single dimension stands out as having the most number of high results across all countries. Two dimensions; Interrelationships with other professions and Trust and Responsibility score the highest with 4 High ratings while five others dimensions (Academic relationship, Ethics, Core Value, Career path models and Professional support) each score 3 High ratings.
The only dimension not to have a High value from any country is Self Regulatory.

Survey Summary - Lows													
			1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
Question	**Major Dimension**	**Minor Dimension**	**Estonia**	**NL**	**Norway**	**Ireland**	**Slovenia**	**Germany**	**Switzerland**	**Sweden**	**UK**	**Turkey**	**Poland**	**Spain**
Q1	Jurisdiction	Jurisdiction	1	3	0	5	2	1	0	0	8	5	10	3
Q2		Interrelationship with other professions	10	7	7	5	9	5	0	4	8	7	10	4
Q3	Knowledge	Level of knowledge	1	3	0	7	6	2	0	0	9	6	10	5
Q4		Entry Level	0	2	0	6	2	10	0	0	4	2	10	2
Q5		Acadamic relationship	5	5	5	5	4	8	1	2	9	8	5	2
Q6		Industrial Relationship	5	5	10	6	5	10	0	1	5	7	5	6
Q7	State Relationship	Monopoly	0	0	0	1	0	10	0	0	5	4	0	5
Q8		Licencing	1	4	0	0	1	7	0	0	2	1	10	0
Q9		Influence on State	10	5	7	4	2	10	5	2	5	7	6	4
Q10		Self Regulatory	1	3	0	4	1	1	0	5	7	2	6	4
Q11	Customer Value	Ethics	7	4	8	7	9	0	7	5	8	7	4	4
Q12		Core Value	0	8	10	5	7	9	5	2	6	7	3	6
Q13		Trust and responsibility	6	6	9	5	8	10	5	5	6	7	6	8
Q14	Membership Value	Career Path models	2	4	8	8	1	10	6	2	7	5	3	5
Q15		Professional Support	7	3	8	2	1	8	6	1	8	7	6	4
Q16		Continuous Learning	5	5	9	6	0	6	7	0	6	5	3	6

Table 23 Survey Summary - Lows

The Lows comparison shows a different story to the Highs just discussed. Noticeably there are substantially more Lows (32% versus 19%) with 4 countries representing the most Low ratings (Sweden, Switzerland, Slovenia and Estonia). Interestingly from a geographic point of view, the Nordics results are at the extremes of each other, with Norway having the most highs and Sweden having the most lows.

With regard to the dimensions, we can see a number of dimensions scored low in a number of countries. In particular, three major dimensions represented the largest number of Low results (Jurisdiction, Knowledge and State Relationship).
The only dimension not to have a Low value from any country is Trust and Responsibility.

Dimension Comparison

In this section we analyse the results of the ratings for the major dimensions of the Professional Model across all countries.

Jurisdiction

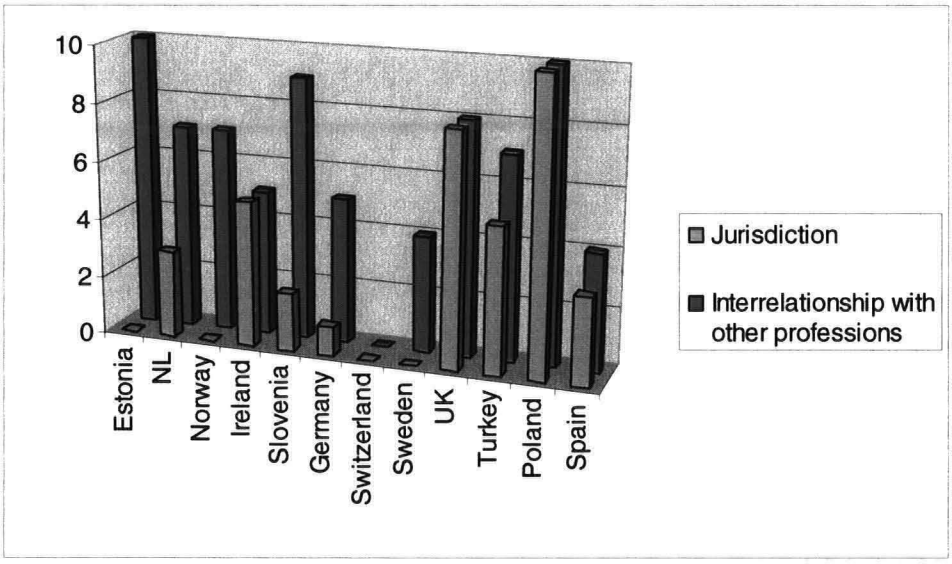


Figure 26 Jurisdiction Dimension

Of the two minor dimensions within the Jurisdiction dimension, the first question 'how well defined is the scope or jurisdiction of your Computer Society?' draws the most Low results. The scale of the question tried to narrow down the people eligible to be member of the Computer Society. Did the societies allow anyone who works in IT generally to joint the society or was member restricted to a narrower, tighter set of people within the industry.

0=Weak	5=Partially	10=Very well defined
Scope is people generally working in IT	Scope is defined as specific job roles within the IT industry e.g. Software Engineer, IT Architect, Technical Support, etc.	Scope is defined as only certain job roles, processes and tasks within the IT Industry. There is clarity as to what roles are in or out of the scope of your Society.

Table 24 Question 1

This question highlights a specific characteristic of the IT profession, it assumes that all people working in the IT industry (help desk operators, PC support, systems administrators, architects, designers, etc.) are professionals and can become members of a professional society. An analogy would be in the medical industry where one professional society might try to represent all sections of the industry, e.g. nurses, medical technicians, doctors, surgeons, dentists, etc. In essence there is no medical profession but a set of professions representing different roles within the industry.

Similarly for the construction industry where one professional organisation might try to represent all the roles within the industry (e.g. plumbers, labourers, brick layers, electricians, architects, engineers, etc.). Again in these more established industries, the jurisdiction of who is eligible and not eligible to join the professional society is more well defined.

The fact that the jurisdiction within IT industry is different is not necessarily a problem but an interesting topic which we will return to later in the document. It is worth noting that the second question in the jurisdiction major dimension that in relation to the working relationship with other professions shows a strong result. We can probably deduce from this that we distinguish what is (or is not) IT but have a weaker distinction within the IT industry.

The results from Poland show a marked difference to that of other societies where it give a top score of 10 to each of the minor dimensions within Jurisdiction.

Knowledge

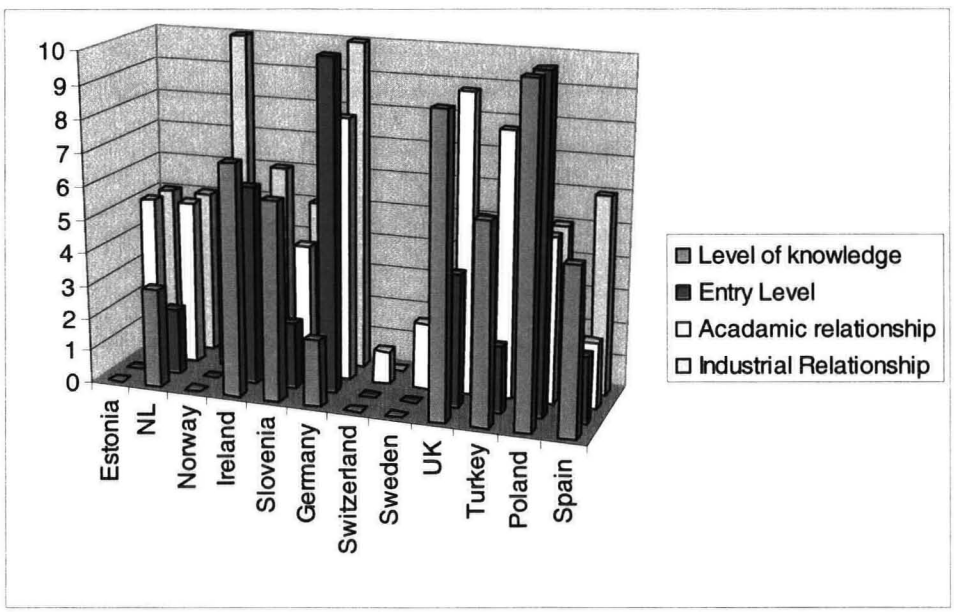


Figure 27 Knowledge Dimension

Knowledge is the 2nd major dimension that scores a particularly large number of Low ratings. Of the four minor dimensions the first two (Level of Knowledge (Q3) and Entry Level (Q4)) are the areas of concern.

The first question asks 'how well defined is the level of knowledge required to be a member of your profession?'

0=Undefined	5=Partially	10=Very well defined
No specific educational requirements required.	Educational standards defined perhaps with experience alternative. Often alternative educational standards accepted (e.g. non-IT related degrees)	Knowledge required is specified and controlled by the profession. Strict adherence to educational standards required

Table 25 Question 3

Five of the Computer Societies answered in the range 0-2 which would mean that no specific education requirements are required to become a member of the profession. This result is certainly a concern as one of the cornerstones of professionalism is the high level of specialised knowledge required. With little or no controls on the educational requirements necessary to become an IT professional, this has ramifications for how the profession operates and for such areas like control, standards, value and ethics.

Only the UK and Poland gave themselves High ratings for this question ensuring that the Knowledge required to be a member of the profession is specified and controlled and that the educational standards are strictly adhered to.

Interesting following entry to the professions, the career path models provided by the organisation seems to be moderate, with three countries each with high and low ratings.

Question 4 examines how tightly the profession itself controls entry to the profession. We have seen in the previous section on professionalism that scarcity creates a demand and generates value for the profession.

The question asked 'On a scale of 0-10, how controlled is entry to your profession?'

0=Weak	5=Partially	10=Strong
No controls, general access to profession once basic criteria met.	Entrants partially controlled, maybe in terms of standards or numbers	Entrants tightly controlled. Profession controls entry standards (e.g. entrance exams) and number of new entrants to the profession

Table 26 Question 4

The majority of the Computer Societies did not put any restriction to entry of the profession once the basic entry criteria had been met (which we know in a number of instances that there are no specific entry criteria). We will examine this later in the document, but the uncontrolled entry requirements and unrestricted number of members of the profession in the majority of countries will have an effect on the professional status of IT.

Germany and Poland are two countries where the results of this question are at odds with the rest of the countries. They give it a score of 10 suggesting that the entrants to

the profession is tightly controlled in terms of education standards and number of entrants.

The remaining two questions of the Knowledge dimension examining the relationship and influence with Academia and Industry show moderate results with medium to high score in some countries.

State Relationship

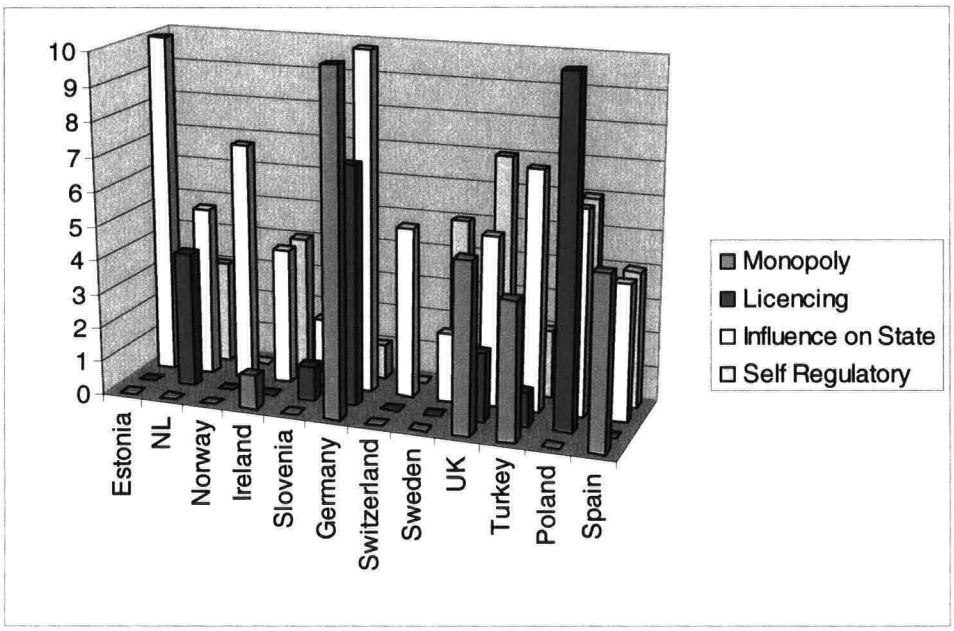


Figure 28 State Relationship Dimension

The third major dimension that has a large number of lows is that of the Relationship with the State. All four sub dimensions have a number of Low results with the minor dimensions of Monopoly, Licensing and Self Regulatory showing the highest number of Lows.

Question 7 asks 'On a scale of 0-10, what is the degree of monopoly your profession enjoys?'

0=None	5=Partially	10=Strong
None. Ability to practice IT does not require membership of profession.	Partial. Only members of your profession have certain privileges but membership is not required to practice.	Profession holds monopoly status. Practitioners must be members of your profession to practice.

Table 27 Question 7

Overall 8 out of 12 countries rated this 0-2 implying that little or no degree of monopoly was enjoyed by members of their profession. The means that you do not have to be a member of the profession to practice IT in the market place. There are no controls or restrictions on people calling themselves IT professionals or providing services to customers on behalf of the IT profession at large.

Again Germany is at odds with the rest of the countries by giving this question a 10 rating suggesting that their organisation holds a monopoly status within the IT industry. Some countries like UK and Turkey are making good progress in this area.

Licensing received only one High (10) value from Poland and received Low values in 9 of the 12 respondents. The question was straight forward 'On a scale of 0-10, what is the level of Licensing required to practice IT in your country?.

0=Weak	5=Partially	10=Strong
No, not required	Partial, in some circumstances	Yes, mandatory.

Table 28 Question 8

Poland, Germany and The Netherlands were the only countries with values out of the Low range, again Germany showing higher values than most.

The results to this question indicate that no licensing mechanism is generally available across the European countries. The absence of licensing means there is no direct way for the state to control the people providing IT services, no registration, quality control or review of standards. As the result from Poland is so vastly different to that of the other countries it is worth further investigation.

The last minor dimension of State Relationship that received a large number of Low results was in regard to self regulation, the question was 'On a scale of 0-10, to what degree is your profession self regulatory?'

0=Weak	5=Partially	10=Strong
Not at all. No self regulatory mechanism in place or not/infrequently used.	Partially. Ability to affect membership of profession, but not licence to practice. Used with moderate frequency.	Fully self regulated, with ability to revoke licence to practice. Frequently used.

Table 29 Question 10

Six out of the twelve countries rated themselves weak (0-2) stating that the profession had no mechanism to regulate its members. The profession has no mechanism to monitor and control the working of its members and hence unable to give assurance to customers of the profession.

This coupled with no entry requirements, unlimited numbers entering the profession and no means to police the working of its members raises concerns over the professional status of many of the Computer Societies.

Customer Value

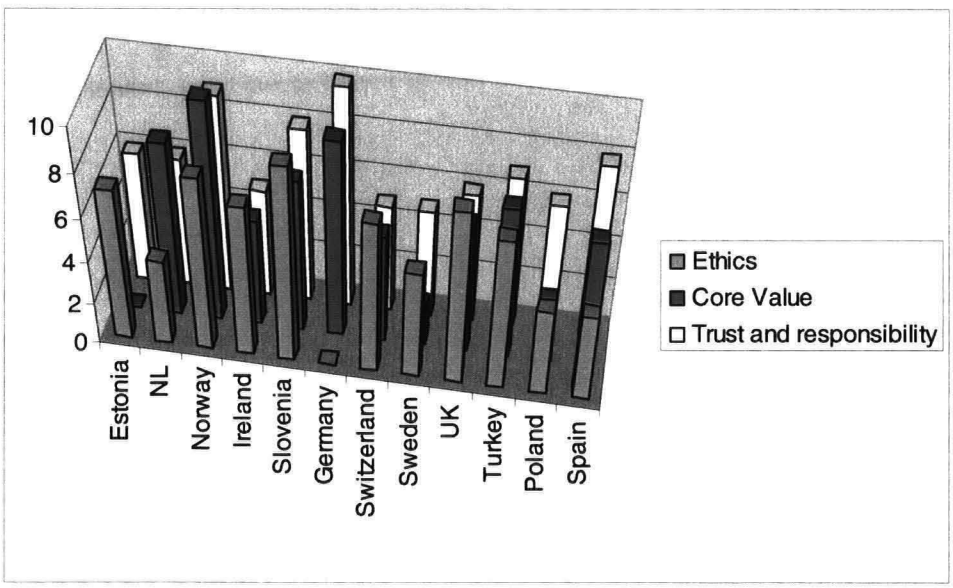


Figure 29 Customer Value Dimension

Customer Value as a major dimension scored reasonably well in the survey. The three sub-dimensions returned mediocre results with all three dimensions scoring High Values (Ethics – 3 Highs, Core Value – 3 Highs and Trust and Responsibility – 4 Highs). Ethics and Core Value scoring 1 and 2 Lows respectively and Trust and Responsibility having no Low values.

Some interesting messages come from this dimension. Germany which has scored highly in many other dimensions and in particular to Entry Level (score 10) has said that it does not have a code of ethics (score 0) in place for members of its society. For all other countries the score on this minor dimension are generally good.

Following the pilot study, Q12 was modified to gain a better understanding of what the Computer Societies perceived was their core value and how well society and industry understood this.
Q12b (below) asks the question, how well is this core value understood by industry and society using the following scale.

0=Weak	5=Partially	10=Strong
Unclear understanding of core value of members of Computer Society.	Multiple and often conflicting core values of members of your Computer Society understood by industry and society.	Your Society's core value is clearly understood by industry and society.

Table 30 Question 12b

Three countries (The Netherlands, Norway and Germany) achieved High Values for this question while Estonia & Sweden returned Low values. The rest of the countries had mediocre scores generally in the middle range 5 to 7.

An interesting angle on this question which we will address later in the document is exactly what the Computer Societies feel the core value of their organization is. This was represented in the answers to question 12a.

Trust and Responsibility (Q13) scored a surprising good score with all countries returning a score greater than 5 and Norway, Slovenia, Germany and Spain scoring High Values.
The question asked what is the perceived level of trust and responsibility of your profession by customers and society.

0=Weak	5=Partially	10=Strong
Not at all. No self regulatory mechanism in place or not/infrequently used.	Partially. Ability to affect membership of profession, but not licence to practice. Used with moderate frequency.	Fully self regulated, with ability to revoke licence to practice. Frequently used.

Table 29 Question 10

Six out of the twelve countries rated themselves weak (0-2) stating that the profession had no mechanism to regulate its members. The profession has no mechanism to monitor and control the working of its members and hence unable to give assurance to customers of the profession.

This coupled with no entry requirements, unlimited numbers entering the profession and no means to police the working of its members raises concerns over the professional status of many of the Computer Societies.

Customer Value

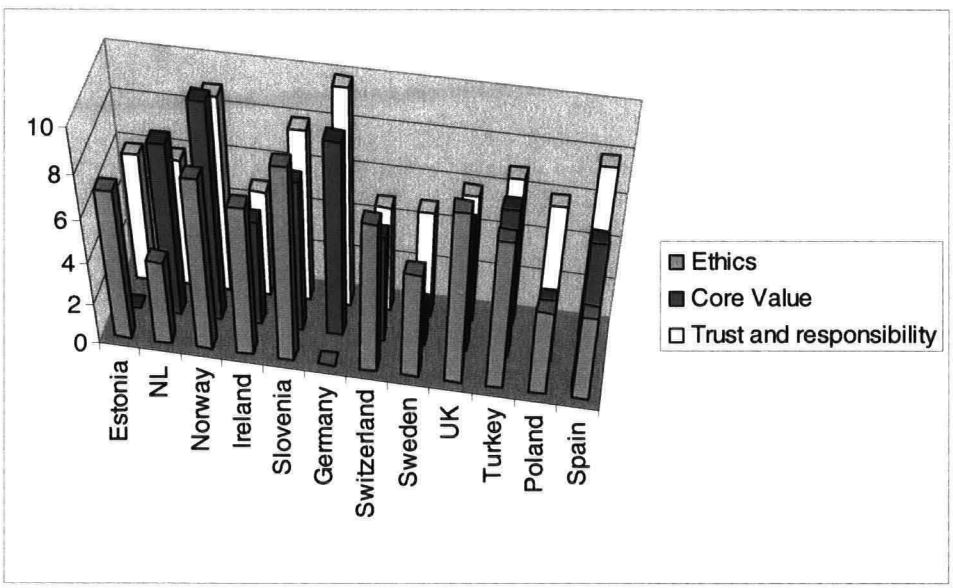


Figure 29 Customer Value Dimension

means to ensure overall support of the professional organisation itself. If the members perceive little or no value, the organisation and profession itself suffers.

The major dimension of Membership Value has 3 sub-dimensions and all three generally came out well in relation to the results of the survey. All except three countries (Estonia, Slovenia and Sweden) had good career path models in place for its members with Norway, Ireland and Germany ranking as having High Values. This is good in terms of helping members to grow their career and to keep abreast of the latest developments.

The second sub-dimension Professional Support focused on the level of support given to members on professional matters (e.g. ethical, knowledge related, legal or client related).

0=Weak	5=Partially	10=Strong
None or very little. Service is not provided to members.	Partial, advice and guidance on request / ad-hoc basis only.	High, office in place to support members on all aspects of professional activity.

Table 32 Question 15

Again a mixed set of results in this dimension with 3 High Values (Norway, Germany & UK) and 3 Low Values (Ireland, Slovenia and Sweden).

The last question of the Membership Value Dimension is that of Continuous Learning.

On a scale of 0-10, What level of support / resources does your organisation have to promote and encourage continuous learning amongst its members?

0=Weak	5=Partially	10=Strong
No programme in place	Available on information only basis. No mechanism to ensure members maintain currency of skills.	Strong formal programme in place to ensure members up-to-date on current topics. Re-certification required to ensure currency of knowledge and skills.

Table 33 Question 16

Of particular relevance to fast changing industries like IT, the requirement to ensure members are knowledgeable of the latest development in the industry is very important for the continued development of the profession and value to industry and society. Most of the answers reflected that there was education or information available but no enforcement or re-certification mechanism to ensure that its members participated in it and there was no requirement for them generally to do so. It will be important to address this in the future as the rate and pace of change within the IT industry could quickly lead to IT professionals not aware of the advances in its industry.

In earlier chapters of this document we discussed the impact that certifications from vendors are having on the IT industry. They are creating a see-saw effect of skills. The onus on a professional society is to developed a long term plan of continuous learning and not be tied to knowledge of individual products.

0=Weak	5=Partially	10=Strong
Poor, seen as potentially mis-trustful and irresponsible. Numerous examples of such exist in society.	Mixed views, maybe no direct negative experience but general media perception.	High, seen as ethical and fully trustworthy, 'pillars of society'.

Table 31 Question 13

The answers in the second half of the scale would generally suggest that customers and societies perceive the IT Industry as trustworthy and responsible with generally positive views about the profession. This feedback while very much welcomed and appreciated is at odds with some of the press coverage regarding the failure and overrun of IT projects in many countries. The apparent disparity between the two views could be the subject for further study.

Membership Value

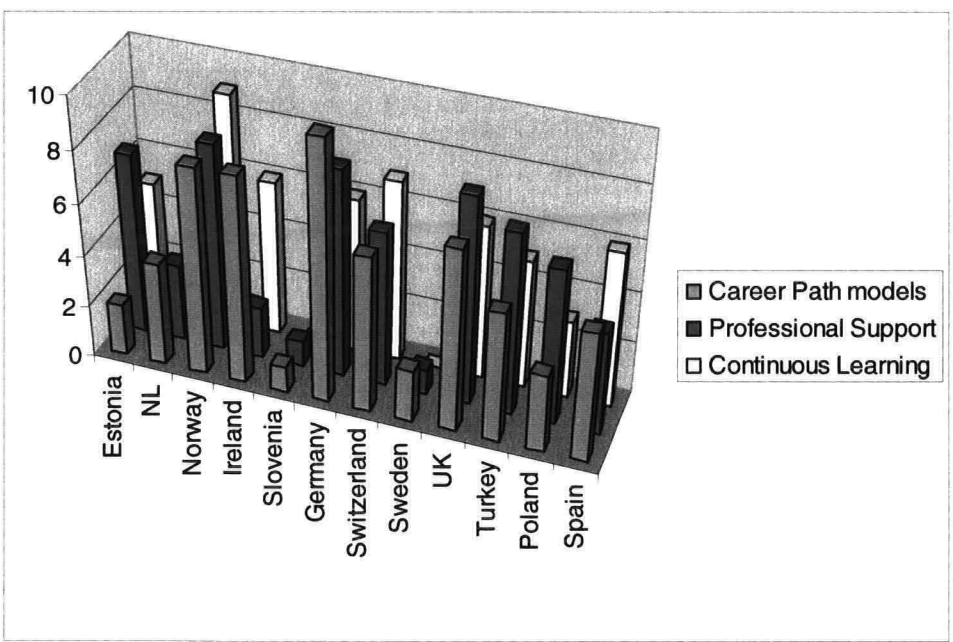


Figure 30 Membership Value Dimension

Every professional organisation must offer value to its membership to both help the professionals grow their career and keep abreast of new developments but also as a

Core Value

We examine now the Core Values of the Computer Societies in the various countries as they responded in the survey. Question 12a) asked the Computer Societies the question what they considered the core value of members of their Computer Society is. The question gave examples of other profession's potential core value and invited the respondents to response in free format text. The table below shows the response to both questions 12a); their core value and question 12b) how this core value in understood by industry and society.

Country	Core Value	Understood by industry and society?
Estonia	The value of the Society by a survey of members is: Network of the professionals	0
NL	Design and build Information systems	8
Norway	Largest network for IT Professionals, Independent/Neutral, High IT Competence	10
Ireland	Design, Build, Maintain, Operate, Educate, Duty of Care	5
Slovenia	Knowledge, Understanding problem(s), Ability to deliver solution, Consult correctly, Understand societal implications of IT	7
Germany	Engineers, Architekt	9
Switzerland	Provide ethical and professional IT services at the height of professional development__	5
Sweden	Ethical, Professionalism, Security thinking	2
UK	IT Expertise for the community	6
Turkey	Professionals that understand technology and its future	7
Poland	Advisory; Innovation; Education	3
Spain	Engineers	6

Figure 31 Core Values

Analysing the Core values above, I suggest there are a number of themes or categories that emerge :

- Design, Build and Run IT systems.

  The responses from The Netherlands, Ireland, Slovenia, Germany and Spain all roughly fit into this category. They articulate that their value is the know-how

and expertise to develop IT solutions from conception to operation. The answers to question 12b) reflect that on the whole this is the perceived value of the members of the Computer Societies by industry and society.

- IT expertise / value for the Community

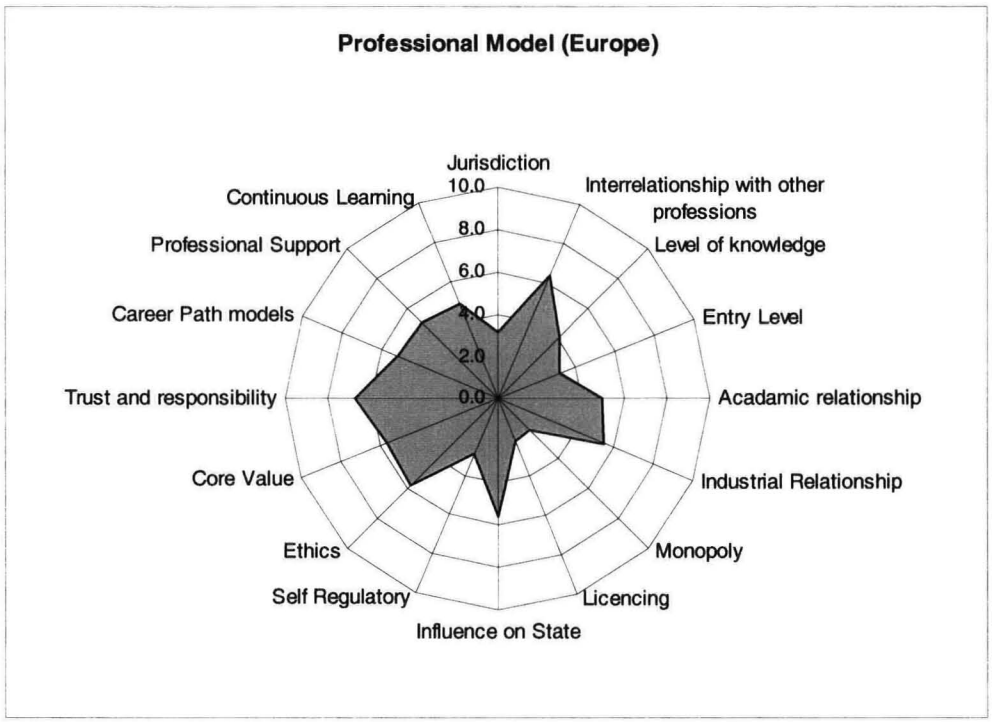
  A number of Computer Societies introduced the social and ethical value of IT in their answers to their Core Value. They talk about 'Educate, Duty of Care' (Ireland), 'Understand societal implications of IT' (Slovenia), 'Provide ethical and professional IT services' (Switzerland), 'Ethical, Professionalism, Security Thinking' (Sweden), 'IT Expertise for the community' (UK) and 'Professionals that understand technology and its future' (Turkey), Advisory, Innovation, Education (Poland).

  While this theme of expertise or value to the community is in over half the societies values it is not generally as well understood as the Design/Build/Run value discussed above. The results from the survey give the understanding of this meaning of core value by industry and society a mid-range rating.

- Networking the IT Community

  This theme generally says that the core value of the Computer Societies is to the members themselves by establishing a network of IT professionals they can interact with. This was reflected by the answers from Estonia and Norway and interestingly they also recorded the lowest and highest score respectively in relation to how this value is understood by industry and society.

Overall European Perspective



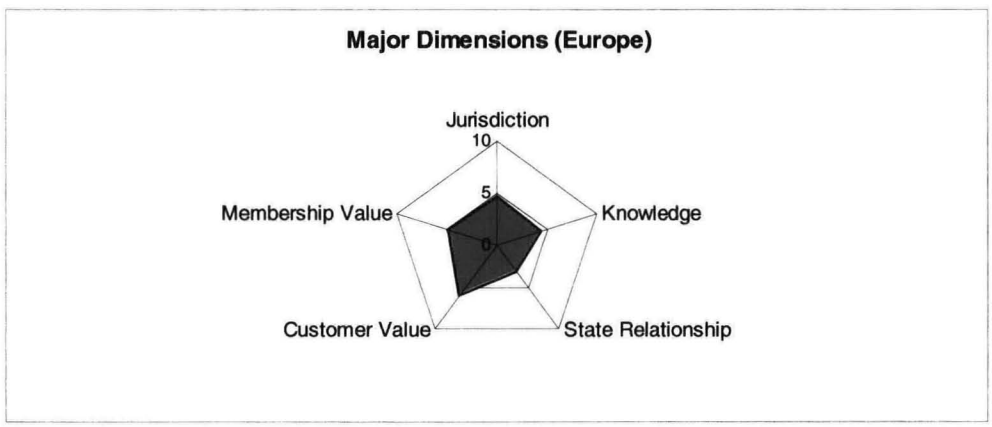


Figure 32 Professional Model (Europe)

As we look at the professional model summarised at an overall European level, it enables us to take a high level view of how the European IT Profession compares with the Professional Model developed earlier.

We can see that of the 5 Major Dimensions, only one of them (Customer Value) is higher than the mid rating with a score of 6. The four other dimensions score lower with State Relationship the lowest.

Within the major dimensions however we see some substantial differences between the minor dimensions.

- Jurisdiction

  We can see in this dimension the significant differences between the two sub dimensions in the professional model, i.e. jurisdiction and interrelationship with other professions. The model highlights that the definition of who is eligible to be members of the profession is weak whereas the demarcation with other professionals is better understood.

- Knowledge

  The minor dimensions Level of Knowledge and Entry Level are quite weak in this dimension representing the fact that entry to the profession in terms of knowledge required and controls on entry are low.
  The dimensions relating to relationships with academic and industry show better scores against the model.

- State Relationship

  This is low on all minor dimensions and reflects the relationship that the computer societies have with the state and the manner in which they are granted licence to operate and control their own profession. Almost all countries returned a low sore for the questions relating to this dimension. It however needs to be a focus area going forward to help strengthen the IT profession in Europe.

- Customer Value

  This was the highest scoring dimension reflecting that the Computer Societies had core values which were generally understood by customers and society and that they carried out their tasks in an ethical, trustworthy and responsible manner.

- Membership Value

  Members of any professional organisation must see value in it for them. This major dimension shows that while some work is done, there is still a way to go to ensure that the societies' members perceive good value from their professional organisation. An improvement in this could have a knock on effect on membership numbers and hence strengthen the profession.

Summary of Key Findings

After analysing all the data returned from the Computer Societies in relation to their current status of professionalism with respect to the professional model defined earlier, I list below the key findings of my research.

- Computer Societies are providing the role of representing the industry in general rather than as a body representing IT professionals. For example, they are more akin to organisation representing the Health Industry rather than organisations representing the professions within it (e.g. Doctors, nurses etc,). Another analogy would be representing the construction industry rather than the professionals within it (Architects, Engineers etc.)

- Their membership criteria is too broad and generally accepts people at all levels working within the IT Industry

- While there is generally a clear distinction of what is in the IT industry and what is not, there are poor definitions of the roles within the IT industry itself.

- The standard of knowledge required to be a member of a computer society is generally unclear with generally no specific education requirements needed.

- The societies place no controls or restrictions themselves on either the quality or quantity of members

- The governments in which the computer societies operate generally do not recognise the value of the profession in terms of setting standards, ensuring quality and self regulation of its members. As such, the societies and its members do not receive favourable status within the industry. Such status may be in the form of licensing, recognition and value of members, etc.

- While the value to industry and society is generally defined and understood, it doesn't differentiate between the industry in general (as membership is generally open) and higher level professionals.

- Members of Computer Societies receive mediocre level of value from the society.

The IT industry is relatively young and the findings above reflect the current implementation of professionalism as defined by the professional model in this document.

These findings will be used in the next chapter to discuss the impact on the key stakeholders and to develop suggested actions to strengthen the IT Profession going forward.

Chapter 5 : Case Study: IBM

Although just one company, IBM is a very large player in the IT market place and is present in almost all categories of the market. Its findings as to what it takes to be an IBMer are applicable and relevant to the broader IT Professional community.

IBM (IBM 2004) is a truly global company working in every business sector employing 316,000 people providing IT product and services to virtually every business sector. It has presence in almost 80 countries serving customers in 165 countries.

IBM has helped define and shape the IT industry with many of its inventions providing the foundations for the IT industry. IBM invented the single-cell DRAM chip, the magnetic disk dive, RISC technology, FORTRAN, the relational database, fractals, Deep Blue. IBM pioneered airline reservation systems and financial trading systems, helped put a man on the moon and a rover on Mars. IBMers have won Nobel Prizes, the Turing Award, the Japan Prize. IBM has received more U.S. Patents than any company in the world for the past 10 years.

IBM has demonstrated its commitment to society by taking the lead on many important issues and providing strong support for initiatives that bring lasting value. It has engaged with Governments and State agencies to help form policies to shape the industry and by working with academic institutions helps to ensure the availability of the next generation of IT professionals.

But IBM is constantly changing and having to re-invent itself. The speed of the IT industry coupled with business and global dynamics means that there is constant change in the company. IBM as a company has enjoyed nearly 100 years by defining itself not in terms of technologies, products, services, pricing or even personalities but in terms of strongly held beliefs and values. These values helped shape its marketplace identify, policies and practices. They committed IBM to be a broad definition of leadership – to be a trusted partner for customers, a reliable long-term investment, a progressive employer and a responsible corporate citizen.

In this section we will describe IBM's Professional model as well as its Core Values. After each section we will compare the developments within IBM with the findings of the survey of Computer Societies.

Case Study: IBM Professions

A few of the large IT organisations like IBM have established an IT professional structure within their own organisation. This structure was prompted by many of the issues identified in earlier sections of this document and was necessary to counteract the shortcoming of not having a general industry wide IT professional organisation.

The benefits of having a professional organisation in IBM are great and have been around for many years. Computer Societies should learn from the work already done in large corporations while defining industry recognised professional organisations.

This section looks at how IBM has established an IT Profession within the company.

What are the IBM Professions? :

- The IBM professions create, support and grow communities of like minded and skilled IBM professionals and managers who do similar work
- Profession members perform similar roles, irrespective of their current job title and the IBM organization they are in
- Professions represent their members worldwide, across all geographies and organizations
- Each profession is directed by governance boards consisting of practicing professionals and line executives, under the leadership of a Global Profession Executive.

The Objectives of the IBM Professions are to:

- Create, support and grow communities of practitioners with similar skill sets and who perform similar roles, regardless of job title and the IBM organization they belong to
- Develop and maintain a pool of consistently skilled and experienced practitioners that differentiates IBM from the competition
- Provide a career path for skills and capability development that broadens the opportunities available to individual practitioners
- Build communities and networks to share best practices and intellectual capital
- Align the practitioner's career and professional development with IBM's business goals

The Value that these professions bring are :

- **Value to IBM**
  - Higher employee morale
  - Consistent quality of skills globally
  - Better project performance
  - Pool of skilled professionals to fulfil client needs
  - Resource supply/demand management
  - Enhanced client and marketplace credibility and customer satisfaction
  - Enhanced employee ownership and more effective employee/management teaming for career development
- **Value to Employee**
  - Defined career path and development roadmaps for advancement
  - Ability to develop and enhance profession skills as a member of a community of practice
  - Increased marketability, utilization, employability, opportunities
- **Value to Customer**
  - Experienced/skilled engagement staff
  - Global resource consistency/availability
  - Better overall performance
  - Reduced risk

The Profession Process is:

- **Standards** setting, including developing consistent, objective worldwide definitions of proficiency levels, education, and experience for each career milestone
- **Mentoring** is a skill and community enhancement process by which experienced professionals facilitate skill and career development for less experienced members
- **Community** building, including knowledge networks, is a critical part of the professions, both formally via forums, conference calls, team rooms and events (Professional Leadership Technical Exchange, Project Management Leadership Exchange, Consultant Leadership Exchange), and informally via ad-hoc meetings, coaching and interaction on engagements
- **Qualification** develops consistent, objective worldwide processes to validate and ensure achievement of profession standards for each career milestone; provides an end-to-end career development process that spans from the junior to the most senior levels and helps create a dynamic and responsive professional to meet the ever-changing needs of the marketplace
    - **Accreditation/Certification/Senior Certification** provides a vehicle for validating worldwide consistent standards of skill, knowledge and experience for practitioners within IBM and is a significant career and development milestone
    - **Confirmation** is a review and validation process for specific cross-profession senior job roles (Principal, Project Executive) that provides a vehicle for worldwide consistent standards for all IBM consulting practitioner leaders

While just focussed on IT Professions in this project, IBM has established professional models for many areas within the company.

Our area of interest is the IT & Services Profession which is subdivided into a number of categories listed below:

- **Consultants** identify new business/technology environment opportunities, align processes to technology using world-class knowledge assets and experts, and team with clients to provide lasting value
- **IT Architects** define IT solutions to client business challenges via architectures, systems, applications and process components and the integration of a broad variety of applications and diverse hardware and software components
- **IT Specialists** support solution construction working in a team with IT Architects. They validate the solution in the context of the solution sale and implement it with a systems integration approach in a technology or business specialty. This is far the category with the largest membership.
- **Project Management** professionals initiate, plan, execute, control, and close projects/ programs, using formal profession processes, methods, tools, and

techniques to manage scope, financials, risks, changes, issues, resources, contracts, and customer satisfaction

- **Product Services** professionals install, maintain and repair IBM and multi-vendor systems and components, including hardware, software and network products
- **Learning Specialists** provide training solutions by assessing, designing, developing, delivering, and managing quality education and training in a variety of media, including e-learning
- **Services Solutions Management** Members of the Services Solutions Management profession are responsible for the development and sales of IBM Strategic Outsourcing solutions directly to customers

Each Profession has well defined criteria at each stage of the profession and provides a model for career development for professionals. The example of the IT Specialist is shown below.

The profession recognises the various disciplines with the field and provides criteria to be met at each level. One significant point is that as a person moves up through the professional model, different core skills are needed at each level from basic technical skills, fundamental IT skills, specialised discipline skills to leadership and executive skills.

The relevance of varying skill levels, leadership skills and scope of influence increases as a person moves up the professional career path.
This model provides a solution to the various skill and entry levels within the IT profession. Similar career models are available for all the other professions shown earlier.

Comparison with European Computer Societies

Companies like IBM have done a considerable amount of work in establishing professions within their own company. These initiatives have developed over time and have matured to a stage where they are recognised within the company and there is a clear understanding of the knowledge, know-how, ability and level of professionalism associated with and expected from each level within the profession. Entry to the various levels of the profession is well defined in terms of knowledge, experience and scope and entry / certification at specific levels is usually done by means of evaluation by a board of peers.

While the size and scope of IBM would mean that it could be seen as representative of the wider IT community, the progress that IBM has achieved in terms of establishing professions is limited to within the company, there is generally no recognition outside the organisation. This is changing though as some Computer Societies recognise the equivalence of the IBM Profession, e.g. the British Computer Society.

When we analyse the findings of the survey of Computer Societies, some of the main messages are that the job roles within the IT industry are not well defined and the entry criteria are generally poor thus leading to lack of standards. These issues have been addressed by IBM (and possibly other organisations) to manage, motivate and quality assure their employees. A positive step forward in terms of establishing IT as a profession within the Industry and society would be to learn from the work already done by organisations like IBM.

By building on the work already done, the Computer Societies can create industry recognised levels of professionalism.

Case Study – IBM Core Value

It is useful to introduce at this stage a discussion on the Core Values of IBM

In 2003, IBM examined its Core Values and asked itself what are the values by which we as employees and as a company believe in and live by. These values then help to define what IBM is, what it stands for and the value it portrays to the people and organization it comes in contact with (customers, society, governments, academic institutions etc.)

IBM went through a novel process to examine its core values. It invited all its employees (every country, every level, and every business) to participate in a worldwide online 'jam'. By using state of the art online collaborative technology it initiated a massive online discussion and debate between all employees of IBM to determine what our values are. This mechanism facilitated expressions, perspectives, expertise from all around the world to come together to help define what are the core values of being an IBMer.

Values Jam July 29-August 1, 2003
Invited all employees to discuss what defines IBM and IBMers. Led to the first reformulation of IBM's core values in nearly a century Duration: **72 hours** Posted comments: **9,337**

Table 34 IBM Values Jam

The Values Jam (July 29-August 1, 2003) lasted 72 hours and received nearly 10,000 postings. Participants in the jam brainstormed under four topics :

- Forum 1. Company Values

  Do company values exist? If so, what role do they actually play? Most companies today have values statements. But what would a company look and act like that truly lived its beliefs? Is it important for IBM to agree on a set of lasting values that drive everything it does?

- Forum 2. A First Draft

  What values are essential to what IBM needs to become? Consider this list: 1. Commitment to the customer. 2. Excellence through innovation. 3. Integrity that earns trust. How might these values change the way we act, or the decisions we make? Is there some important aspect or nuance that is missing?

- Forum 3. A Company's Impact

  If our company disappeared tonight, how different would the world be tomorrow? Is there something about our company that makes a unique contribution to the world?

- Forum 4. The Gold Standard

  When is IBM at its best? When have you been proudest to be an IBMer? What happened, and what was uniquely meaningful about it? And what do we need to do – or change – to be the gold standard going forward?

The outcome of the Values Jam was a re-definition of IBM's core values. These values fundamentally define what IBMers stand for and provide a form of DNA for the company.

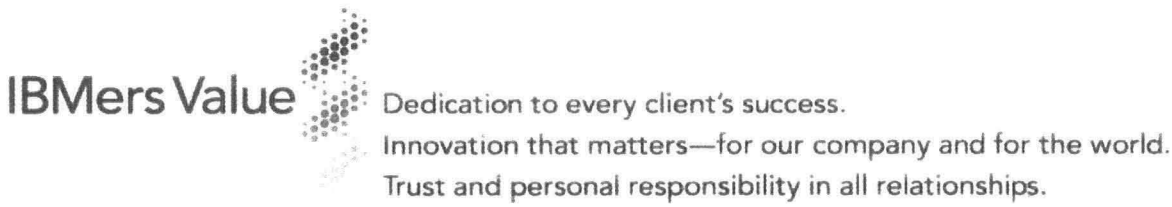


Figure 37 IBM Values

The three values focus on the core attributes of what it means to be an IBMers. They are simply yet profound and long-lasting.

IBM went on further to hold more 'jams' to examine these values in more depth and how it can turn these values into a reality. Two more jams have been conducted:

- **World Jam, October 26-28, 2004**
  IBMers identified actionable ideas for making the company a living, breathing embodiment of our values
  Employees later rated the ideas
  Senior management committed to action on 35 of the top-rated ideas
  Duration: 54 hours
  Posted comments: 32,662

- **Innovation Jam, July 24-27, 2006**
  Innovation Jam explored how IBM's exciting new tools, technologies and capabilities — many never before shared publicly — can be combined with real-world insights to create new market opportunities and business partnerships. The goal: to solve some of today's most important business and societal issues.

  One innovative aspect to this Jam was the wider community were invited to participate in helping to define what innovation matters to them. Family members, friends, clients, governments and academic institutions participated in this jam.

Comparison with European Computer Societies

It is interesting to compare the core values that IBM and its employees defined with those provided by the European Computer Societies (Question 12a in the survey).

The focus from the computer societies is mainly on providing technical knowledge and the skill of designing, building and running information systems.
They express their core values in the know-how of their members (IT professionals) and provide this expertise to customers and society with an awareness of the ethical matters. They are experts in the technology, know how to use it and understand the future potential.

IBM's core values focus on what it can do for its clients, how it can help make them to be successful by using Information Technology. This means that IBMers need an understanding of both technology and the clients business environment and to design, develop, build information systems designed to make them more successful.

Rather than just understanding future technology, IBM's core values focus on innovation. Innovation that matters for itself in terms of new ways of doing things (products, services, processes) and also for the wider community. How it can apply what it knows to develop innovative solution for the society in general; solving real issues.

IBM's third value states trust and personal responsibility in all relationships. The survey results show the mention of ethics, professional, social implications and IT expertise for the community.

There is similarity and overlap in many of the core values of the computer societies and IBM. This is a good sign and an indication that the industry is closing in on the value it can offer society at large. The difference is probably the crispness of the values and the benefactor of the values. IBM's is straight forward, easy to understand by customers, employees and society and they focus towards customers and society and what they can expect from IBM. The Computer Societies are slightly more inward looking focussing on the skills and capabilities of its members with less focus on the benefits they can provide to other parties.

Chapter 6 : Stakeholder Impact

In this chapter we will analyse the key findings from the previous chapter and discuss their impact on the key stakeholders involved in this project. Suggested actions and improvements will be made throughout the chapter.

This chapter corresponds to Activity 4 in the Soft Systems Methodology (SSM) model.

From earlier chapter we know that the key stakeholders are :

- Computer Societies
- IT Professionals
- Academic Institutions
- The State and regulatory bodies
- The IT Industry itself (e.g. companies who employ IT professionals and customers who buy their services).

The impact on each of these stakeholders will now be discussed.

Computer Societies

Not surprisingly the Computer Societies are affected most by the findings of this research. They are the incumbent organisation representing IT professionals and hence any suggested action to improve the level of professional recognition will affect these organisations.

Professional Job Role Definitions

The first finding in relation to the study questions the role of the Computer Societies as organisations encompassing all roles within the industry or purely focus on professional roles (with high knowledge content). There is a need to recognise the various roles within the IT industry and provide a framework or model for each one. Encapsulating all roles together, I believe is one of the causes for the lack of clarity as to exactly what an IT professional is.

Some computer societies have made very good progress in this area. For example the British Computer Society's creation of a Chartered status for IT professionals distinguishes ordinary members of the society from those who gain professional status.

The challenge to the Computer Societies is that the roles within the industry are fluid. The rate of change introduces new roles (e.g. web designer, help desk agent, etc.) regularly while at the same time sun-setting previously established roles (e.g. storage tape operator, Telephone Switch Operator, etc.). This challenge facing the Computer Societies is as a consequence of the relatively young age of the industry however I think it is important to establish broad categories of membership even though the skills and technology (and the professional roles) are still evolving.

We have seen in the US approaches to separate the 'Software Engineer' profession from the mainstream Computer Societies. I believe the motivation to do this could stem from the need to distinguish this professional level from ordinary members of the Computer Society. I see Software Engineering as potentially one role within the general industry, and believe there is more to gain by staying within the IT industry and work on the recommendations in this chapter as a combined professional organisation.

Recommendation:
Establish recognised job roles within the IT Industry and define levels of professionalism associated with each one.

The Computer Societies should take advantage of the job roles defined in companies like IBM to help them define the roles within the IT industry.

When the roles are defined, it is important to ensure the entry level criteria are appropriate to the level of membership. The survey shows that the majority of the Computer Societies had generally loose membership criteria. In order to promote professionalism for certain roles and grades within the IT industry it is necessary to tighten up both the educational and experience requirements required for entry. This action is key if professional standards are to be set and maintained.

Recommendation:
Implement strict entry criteria including educational and experience levels to the professional levels within the IT industry.

The Value of the Profession

The area of Value is very important to improving the status of the IT profession. Professionalism will only succeed if value is perceived from both the Computer Society itself and its individual members.

The value must be delivered to all stakeholders:

- Customers must know what an IT professional stands for, they must recognise the level of education and experience required to become a professional. They must recognise the level of 'guarantee', quality and ethics of the professional and they should recognise the support both to them and the IT professional provided by the Computer Society.
- Employers of IT Professionals should recognise the value of the professional status and establish a pre-requisite that professional status is essential for certain roles within their organisation
- The State should support and recognise the professional status of IT and appreciates the value that the IT industry is maturing, controlled and operates within a quality and ethical framework.
- The IT professions themselves must also get value. Typically they have to see the value of professionalism recognised by the other stakeholders first to fully engage and support the Computer Societies. Once a value is put on professional status by the market, this will be an incentive for people working in the IT industry to gain professional status.

The value of an improvement in the level of professionalism in the IT industry is perhaps the hardest item for Computer Societies to achieve, yet it is both necessary and required to strengthen the growing IT professional. I believe this is the greatest challenge to growing the level of professional. It is a multi-faceted task that requires the

involvement of the other stakeholders. Like beauty, Value is in the eye of the beholder and it is only recognised by other parties.

While a difficult task, there are many examples around where occupation groups have created a value proposition and ensured that they are valued by the stakeholders discussed above.
Examples in the industry include the body of Electricians in Ireland where they created a Register of Electrical Contractors in Ireland (RECI). The objective of this registrar was to give value to consumers (quality, ethical, controlling organisation, advice and guidance, registrar of members etc.). Their members met high standards in terms of quality, experience and work ethic and the organisation embarked on a marketing campaign to promote the value of its members to consumers and the building industry. The campaign was so successful that membership of RECI is a key selection criteria (and in many instances a pre-requisite) for electrical work.

A related example is the initiative of the quality standards organisation to market the value of having achieved certain quality certifications, ISO 9000 etc. The value proposition they sold to stakeholders ensured that achievement of this standard is often a pre-requisite for doing business with companies and government bodies.

These two examples succeeded in generating a value statement to customers and industry in general that had a 'pull' effect on the people working in the industry. Suddenly the organisation's value statement generated a demand that provides an advantage to its members, customers and society.

Computer Societies must follow examples like this and create value statements for itself and its members and promote this value to customers and society. This in turn will create a pull effect on practitioners in the IT industry.
We are seeing pockets of this already in the industry, but instead of the initiatives coming from professional societies they are coming from vendors who promote the value of having achieved the certification level in their products and services. While this is to be welcomed in terms of ensuring skills level, it does not address all the elements of professionalism, e.g. ethics, standards, controls, etc. It also is very time dependent and creates the see-saw skills effect as we saw in the earlier chapters.

Creating the value statement and having it recognised is essential to strengthen the IT profession.

Recommendation:
Create a Value Statement for the IT Profession which is recognised by all Key stakeholders.

The IT Industry

The IT industry has an important role in helping to strengthen the IT professional. In earlier chapters we noted that the IT vendors had promoted professional certification in order to ensure the required level of skills and knowledge were available to use its products. While this is necessary and welcomed, the promotion of proficiency in product knowledge by itself does not provide a level of professionalism. It is the broader concept of professionalism that we are endeavouring to improve.

The role of the IT industry (employers of IT Professionals) in establishing IT as a professional organisation is very important. It is also important that the Industry participates in this initiative fully in order to help grow and maintain the long term viability of the industry. Remember, the key motivation for undertaking this research was the decline in the number of students selecting IT as a career. I believe that the establishment of a stronger IT Profession will help address this decline and this will have a positive benefit to the industry.

The impact of this increased level of professionalism to the IT industry is as discussed below:

- The industry can help create the value statement for the IT professional and once created take actions to recognise its value. These actions could be of the form :
    - Insisting on membership of the profession for professional roles, e.g. a company would only employee someone as an accountant if they were members of the relevant professional body.
    - Differentiate between members of the profession and those who are not (e.g. career opportunities, pay, rates, roles etc.)

- Actively promote membership of the profession and its value to employees integrating it within their career path.
- Promote value of the profession to customers (internal or external)
- The IT Industry has created the strong product certification market where in some sections of the industry a person's market value is determined by the product certification they have achieved. The Industry has to look past product certifications to the broader definition of professionalism that is needed to ensure the long term sustainability of industry.

- Recognise the Computer Societies as controlling the standards, ethics and quality of professionals. Many organisations (e.g. IBM) have established internal profession levels inside their own company. While this is applauded and helped grow the level of professionalism within the company, these had no recognition in the industry in general. To help grow the IT profession, companies should promote and recognised the industry standard levels of professionalism within the various job roles and use them as an alternative to their company defined standards. For the IT professional and companies this will create transferable levels of IT professionalism and will have the benefit of creating single standards across the industry.

  Some companies are already working closely with Computer Societies to share the knowledge and experience of establishing internal professions in order to promote the recognisable industry standard professional. An example of this is IBM working with the British Computer Society to help define their levels of professionalism.

Recommendation:
IT Industry should fully participate in the creation of a Value Statement for IT Professionals and take actions to promote the profession within its own company and with customers.

The State and regulatory bodies

Historically the State has played important roles in Professions and in many cases was responsible for the creation of a profession by giving the professional society monopoly status.

Times have passed and while I would not promote the monopolising of the IT marketplace to members of a particular society, the actions the State takes can have a definite influence on the establishment of an IT profession.

Areas where the State can have an impact on the enhancement of the IT profession are discussed below:

One of the key interests that the State has is in the quality and competitiveness of the IT industry. In recent times we have witnessed the failure of IT projects which damage the industry image thus affecting the not only business but the attractiveness of the industry to new entrants, e.g. students.
By ensuring that the value statement of the Computer Societies covers the areas necessary to minimise such failures, the State can promote membership of the profession as having a positive impact on society.

In fact it can take a leadership role in this by insisting that membership of the profession is a pre-requisite for State contracts. Similar approaches were taken for example by quality organisations, e.g. ISO 9000.
Recognition and endorsement by the State will go a long way to enhance the status of the IT Profession, what is key is the value received is demonstrable and of real value. Given the current position of the IT industry driving towards an official monopoly status is not practical nor desirable, I believe we can achieve the desired affect by developing a strong value statement which is endorsed by the State and supported by Industry. Market forces will then take over to ensure the demand for people with professional status will emerge.

As the survey discovered relationship with the State was generally low in all countries surveyed. Organisations like the Council for European Professional Informatics

Societies (CEPIS) could lobby for recognition at EU level which will have a significant effect on the recognition of Computer Societies.

Recommendation:
The State should take a Leadership role in endorsing membership of a professional Computer Society.

Academic Institutions

Academic institutions provide the IT training for students in the industry. The first computer specific courses probably started around the late 1970s and have grown exponentially in number since then. The majority of courses have a very strong proven track record and have greatly contributed to the growth of the IT industry by providing many graduates.

Academia has a big part to play in the strengthening of the IT profession. Some areas where they can have impact are discussed below:

- Many computer courses concentrate on the development of technical skills for its students. While this is correct and appropriate, academic institutions could help in the establishment of a stronger IT profession by introducing into their courses 'soft' skills in relation to professionalism. These skills should focus on the Core Values of what it means to be an IT professional and could include topics like ethics, professional value, responsibility of a profession etc. On completion of a primary degree students should have a good grounding as to what it means to be an IT professional, what standards are expected, what their responsibilities are to clients and the wider society. This should form the basis of their professional career.

- Academic institutions provide the basic level of IT education required, but they themselves are feeling the effect of the professional certification programmes offered by the major vendors. The teaching of Computer courses is facing competition for skills. In many cases, employers will value professional

certification over a university degree. This is due to the demand for specific vendor related skills. While specific skills will always be needed and IT professionals should ensure that they keep abreast of new developments, a university degree and professional status needs to ensure that it is always has greater value.

- Like many professional associations, a university degree needs to be complimented by relevant experience to become a professional member. Universities have a part to play in promoting the profession (and value of it) and encouraging its students to pursue entry to the profession as a means of professional practice.

Academic institutions play a crucial role in educating students on the core value of IT professionals and ensuring that they are aware of their responsibilities and what clients and society expect of them. They need to work closely with Computer Societies in helping them establish the core value of an IT Profession and with industry to ensure that the value of their degree is not devalued by professional certification. The strengthening of the IT profession (including value, roles and entry criteria) will help to enhance the value of computer degrees as the primary route to becoming an IT profession.

Recommendation:
Academic Institutions can help strengthen the IT profession by including in their curriculum subjects relating to the core value of the IT profession and on the meaning and value of professionalism.

IT Professionals

Last but not least IT Professionals themselves have to take responsibility for establishing IT as a professional organisation. They need to have both the motivation and desire to strengthen the occupation that they are in. Without the support of the existing IT professionals any move to improve on the existing value of IT will not work.

Many of the key stakeholders are themselves IT professionals so working together to establish a combined goal is the best way forward.

Below are discussed some areas where IT Professionals can make an impact on the establishment of a stronger professional association.

- Help create and live up to the value of an IT Profession. Live up to the standards of quality and ethics expected of a professional.
- Promote professional membership of Computer Societies by promoting within your own company and placing 'value' on a candidate's membership of a Computer Society.
- Use the career path models from the Computer Societies as a basis of your own career development and those working with you.
- Help promote the value of IT as a profession to potential new entrants.

Ultimately market forces will help enhance the value of IT as a profession. It will create a demand for professional members of a computer society and will place value on the attributes of professionalism over the short lived professional certifications. Driven by strict entry criteria to the professional roles of Computer Societies, clients and society will get a 'guarantee' of the people accredited at this level.

The IT market to-date has been driven by skills shortages, product certifications and unregulated quality. This has led to the entry of a vast array of people entering the profession and assuming the role of IT profession. By classifying different roles within the profession, establishing stricter entry criteria and creating a strong value statement, the IT profession can establish itself as a valuable contributor to society.

To be a success IT Professionalism has to come from the practitioners themselves !

Recommendation:
IT practitioners must take an active part in establishing the value of an IT Professional organisation and use their position within the industry to live and promote its values.

Social Closure

All the key stakeholders identified above will be impacted by the establishment of a professional IT organisation and have a key part to play in helping it to come about.

To start making improvements the lead is with the Computer Societies and they must take the initiative. The most important activity is the development of a core value statement for IT Professionals which is agreed and supported by all the key stakeholders.

Once this is created and agreed, roles and strict entry criteria can be defined within the society. This will ensure that the clients and society know what level of knowledge, expertise and quality to expect from members of the profession.

Members themselves must see the value in being part of the profession and help contribute to its establishment and ongoing value.

Ultimately however market forces will have an impact on the success of this initiative. The stakeholders must create a **demand** for the IT professional 'product' that it is creating. They need to all jointly help to establish the demand by virtue of the value statement that is going to materialise as a result of their efforts. The core values of the professional organisation should differentiate the professional organisation from the practitioners' norm today and create a need in the marketplace for people to be members of a professional IT organisation.

The demand in turn will create a supply effect that will help enhance the value of the profession. Due to the strict entry criteria, specifying specific academic qualifications and professional practice the relatively free for all, anybody can do it attitude will change and as the standards rise, so to will the relative 'scarcity' that will force an increase in value.

The market force factor in establishing the IT as a professional organisation is reflective of Larson's Professional Model (Larson 1977) discussed earlier where the Economic Order and Social Order lead to Social Closure by combining scarcity of high level knowledge with high status, respectability and trust to establish a professional organisation.

I believe that the timing is right to drive this initiative forward now and the recommendations outlined in this section will contribute greatly to the establishment of an IT Profession.

This findings and recommendations in this document represent a significant contribution to the structure and workings of the IT Profession. Its outcome will contribute to the enhanced standing of the IT profession which in turn will make it a more attractive profession for students to join and professionals to stay.

Chapter 7 : Professional and Methodological Reflections

After completing the project it is worthwhile to look back and critique the methodology used and to discuss the impact the study had on my professional knowledge and practice. By doing this we can learn about improvements for any future in this area.

Reflections on Research method

We will first look at the methodology used (Soft Systems Methodology (SSM)) and discuss its fit to the study undertaken and any changes or recommendations we would suggest for similar future studies.

SSM was chosen initially as the research methodology due to its human centric approach, taking a holistic picture of the problem, analyzing the conceptual model, comparing it the real world environment and the suggesting actions to improve the situation. The four main phases provided a template by which to conduct the research.

This approach suited the study exactly; the problem initially was vague, there was a sense that something was wrong and needed to be improved but it was difficult to nail it down. The methodology enabled me to take a total holistic view of the problem, to understand the market place and its players and to come to the conclusion that the current environment was not offering students a good career path in Information Technology. By going through the first phase of SSM, it helped to understand the problem that we were trying to solve by looking at what is happening in the IT marketplace and the community in general.

The second phase of SSM provided a focus to understanding the conceptual meaning of professionalism, what is it, what makes one group professionals and another group not, how do professionals interact with society?
The second part of this was to understand what research was currently being done on professionalism in IT and to learn from that. By combining the two parts, I developed a model of professionalism by which I could compare and contrast the Computer Societies around Europe.

In order to compare and contrast the implementation of professionalism in the various Computer Societies with the Professional Model I developed, I choose an online survey as the most appropriate data collection mechanism. I choose this approach for a number of reasons;

- The respondents were not native English speakers and hence the written word was easier to understand than the spoken (e.g. interview)
- The respondents were generally part-time officers of the Computer Societies and were working full time during the day and many of them were not available for interview as they were on client sites.
- The respondents were spread across many countries in Europe and not feasible to meet.

The survey approach was the correct one.

I did one thing however that really had a very positive effect on the project and which contributed greatly to its success. I contacted the Council of European Professional Informatics Societies (CEPIS), an umbrella organization representing the majority of Computer Societies in Europe. I wanted to discuss my project with this organization to test whether it was both desirable and feasible (in the words of SSM). When presented to CEPIS, I received a very positive response, they recognized the problem but had not tackled it to any great extent and warmly welcomed the research that I was doing to help them understand the level of professionalism executed through the Computer Societies in Europe. As well as the subject area, the time was right as they had recently identified the area of IT professionalism as one of their major initiatives. Based on their recognition of this valuable area of research, they endorsed the collection of the data from the Computer Societies and the survey was sent out with a letter of endorsement from CEPIS. This added weight and credibility to the study.
I believe that this support from CEPIS contributed greatly to the high response rate I received. It is worth noting the high level of positive comments I received from the Computer Societies when returning the survey form and their interest in learning about the results.

The stakeholder impact and actions were facilitated by the questions in the survey and their response. They are real solid feasible (ala SSM) actions that can be taken by the key stakeholders to improve the level of professionalism in IT.

A lot of things went right and contributed positively to the outcome of the survey. There are however always areas for improvement which are discussed below.

Due to the European nature of the study an additional element of analysis could be the language and cultural impacts of the professionalism. English was chosen as the universally accepted IT language and while all respondents could read English, we did not measure the level of English and their understanding of the meaning of the questions in the survey.

Additionally, different cultures may have different attitudes to answering surveys and there may be cultural differences in the implementation of professionalism in their countries. These were not taken into account in the current study.
A potential action for future studies is to analysis the cultural impacts of professionalism and in addition to the study follow it up with face to face interviews in the respondents' native language. These suggestions would enable a more detailed understanding of professionalism in the various countries and in particular the understanding of the relationship with society, the State and Academic institutions in those countries.

This potential future area of study is best contained in the comments of the Vice President of the Spanish Computer Society (Asociación de Técnicos de Informática).

"Being the IT profession a relatively new one it is still in the process of consolidation, but it is necessary to bear in mind that in Spain, in the IT profession there are a quite high percentage of people with educational backgrounds not related necessarily with IT. Most programmers are the product of in house training, and this is the case of medium age professionals in quite a few cases. In Spain, in general, there is a generalized opinion in society that in order to practice a profession it is not necessary to belong or being certified by a professional society. In fact only architects and lawyers have a formal professional status with requirements to belong to an established professional society. In the generic engineering field, in order to practice there is not a formal requirement to belong to a

professional society, but it is necessary quite often to belong to one if a project must be signed.

In Spain the requirements for practising a profession are fixed by the State, and there is no self regulation as such. The continent is different basically in this matter from Ireland ad the UK that is the Anglo-Saxon culture is different in this question, and we must say that the questions in the survey are sometimes biased strongly on the Anglo-Saxon experience."

While this study has contributed greatly to the area of professionalism in the IT industry, we are still in the formative years of the IT profession and there are many areas of research still to be conducted. I hope this research has contributed to the development of a future profession in our society.

Impact on Professional Knowledge and Practice

The study was motivated by my passion and desire to improve the level of professionalism in the IT industry as I saw it as a major deterrent to attracting students to enter the IT industry. This is turn was causing a skills shortage which if not reversed would impact the industry as a whole.

I was aware of initiatives in some Computer Societies (most notable the British Computer Society) but I wanted to fundamentally understand the problem and develop a model that would be used across Europe. In my role within IBM the market I work in is European and similar skills issues exist in all countries. So for me my interest was in understanding the level of IT professionalism in Europe as a whole and coming up with actions to improve the situation.

To this end, my approach to CEPIS was key and from a professional impact point of view was very important. After discussing my study with CEPIS, I was wholeheartedly satisfied that the subject I was trying to address was something that they found extremely valuable. They had recently recognized it as a high focus area for their organization as they were seeing the same drop off in students that I witnessed and the same quality and other professional issues with the implementing of IT professionalism across Europe.

I understood then that I had the potential of making a very valuable contribution to the IT industry, the subject was very topical and the timing was just right. The study I was conducting was innovative and had not been done before. CEPIS were very supportive and agreed to include a letter of endorsement with my survey to its Computer Society members in the countries. I believe this endorsement contributed to the high success rate and a number of respondents expressed a lot of interest in the results of the survey as they recognized the issue as one of the biggest issues facing the IT industry today. I committed to publishing the results in their publication UPGRADE to share the results.

Another part of the study which had a positive impact on me was the IBM case study. I examined IBM's implementation of the professional model for IT and its definition and meaning of its Core Value. It reinforced to me the position IBM holds in the IT industry in terms of leadership and innovation. Many of the initiatives in IBM were best of breed and could help progress the level of IT professionalism within the wider community. The realization of this gives a satisfying feeling that you were working in one of the best IT companies in the world.

It was at this stage of the study that I realized the benefit and appropriateness of the Doctor of Professional Studies programme. The subject I was studying is best tackled from within the industry and profession. It relies on experience and knowledge and my position within IBM of working in a European environment was ideal to initiate and contribute to this area. I realized that the professional doctorate is the best and most appropriate mechanism to address this issue and the DProf programme is an ideal match.

In summary, overall I have a sense of great satisfaction in the fact that my area of study is very valuable, appreciated and timely to the profession in which I am a part of. I feel I have brought an innovative and informative approach to the issues being addressed. In SSM terms the changes are both desirable and feasible.

Chapter 8 : Summary & Conclusion

This project was motivated by a personal desire to help reverse the decline in the number of students selecting IT as a career choice. I felt that the lack of a strong IT Profession contributed to this decline in interest in IT. By strengthening the IT profession, perspective students could associate with being a professional and have a clear understanding of their values and have a recognised position in society. A stronger professional organisation would help to provide a career path for prospective and existing IT practitioners as they progress through their career.

The objective of my study was to examine the emerging IT profession today and to develop a set of recommendations that would advance the level of professionalism within IT.

As one of the main elements of the Doctor of Professional Studies (DProf) programme is to make a significant contribution to my profession, I consulted widely in selecting the area of research to ensure it was worthwhile and valuable. One of the organisations I contacted was the Council of European Professional Informatics Society (CEPIS), an umbrella group representing Computer Societies across Europe. Their strong interest in the project led to an endorsement of the survey used to gather the main source of data for the project. I also wanted the research to be European wide to reflect my role within IBM as running a large organisation across all countries in Europe. The support of CEPIS was invaluable, they themselves had recently identified the area of IT Professionalism as a key focus area for them and fully supported and welcomed my research in this area.

Due to the nature of the research being conducted the methodology selected was Soft Systems Methodology (SSM). This methodology proved ideal for tackling the type of problem that was addressed in this project. The problem was unstructured, human and social centric and enabled me to take a holistic view of the problem to be solved. The four main activities in SSM helped guide our research through the project and to enable me identify changes that are both desirable and feasible.

Activity 1 of SSM helped me understand the problem to be addressed. In this activity I took a look at the skill shortages facing the IT industry and then progressed on to an understanding of how the IT market works and who the main players are. This section demonstrated that the IT market is created and serviced by a small number of dominate global players and these players are defining the concept of IT professionalism through their vendor specific certification programmes. While the skills certification programmes are of value, they provide a short term solution for vendors ensuring sufficient skills in the market place to sell and support their products. This product based concept of professionalism is short lived and creates a 'see-saw' value effect instead of a longer term professional development. This professional certification characteristic alone is having a detrimental effect on IT professionalism and a broader more encompassing view of professionalism is needed.

During Activity 2 of SSM I examined the conceptual model of professionalism and as a result developed a model of professionalism for IT that I could use to compare and contrast with what is happening in the real world. In this activity, I examined professionalism from multiple perspectives. Firstly, the sociology view of professions enabled me to understand the development of professionalism through the last century and the major initiatives and movements that have shaped professional organisations to the present day.

This was then followed on by understanding what constitutes a professional association. What are the characteristics of operational groups and their relationships with the state, society, other professional bodies or their own members that defines a group as a professional organisation? In this section I took a conceptual view of what is needed for a professional organisation to be created and maintained. One of the key influencers in this activity was the work originating from the Chicago School of Sociology (Larson 1977) and the Professional Project.

Thirdly I examined the ongoing work on IT as a profession. This is quite an active area of research mainly originating from the US and I categorised the research in this area in terms of Professional Definition, Jurisdiction, Certification and Licensing and Curriculum Development. During this section the recurring need to demonstrate 'value' from the IT profession was highlighted.

The culmination of the above activity was the development of a Professional Model that I could use to compare and contrast the conceptual view of IT professionalism with what was happening in reality in the real world. The model developed discussed professionalism in IT among a 5 major dimensions (Jurisdiction, Knowledge, State

Relationship, Customer Value and Membership Value). These major dimensions were comprised of a total of 16 minor dimensions to help focus on more granular characteristics. A visual 'web-like' graphic was used to represent the Professional Model.

Activity 3 of SSM is the comparison with the real world. During this activity I used the Professional Model developed in the previous activity to understand how the implementation of IT professional in various European countries compared to this model.
The main mechanism used to do this comparison was an electronic survey. This proved the most efficient mechanism due to language and the geographic distribution and availability of respondents.
With the endorsement from the Council of European Informatics Societies (CEPIS), the survey was completed by 12 European Computer Societies across Europe.
This high level of response provided data on which to conduct an analysis of the implementation of IT professionalism by the various European Computer societies compared to the conceptual model developed in the previous activity. The results were analysed by country, the high and low values and by the dimensions of the professional model. In addition as a result of feedback from the pilot survey I asked a question regarding what the Computer Societies saw as their 'value statement' and the analysis of the results provide some interesting findings.

The key findings from the survey highlighted a number of areas for improvement that formed the set of recommendations for the key stake holders in the next activity. In general at a European level there are areas of improvement required in all of the major dimensions however we have also found that some Computer Societies are making good progress in many of the areas which should be shared and leveraged in the other countries.

During this activity I also examined IBM as a case study in terms of how it has developed a professional model within the company and what its core values are and how they were developed. This case study is very relevant as IBM is one of the dominant players in the IT market and with over 316,000 employees serving 165 countries and enables us to take a global view of IT Professionalism.

The fourth SSM activity took the findings of the survey of professionalism as implemented by the European Computer Societies and developed as set of recommendations for the major stakeholders of this project. The recommendations for each of the major stakeholders are re-produced below:

- Computer Societies
  - Establish recognised job roles within the IT Industry and define levels of professionalism associated with each one.
  - Implement strict entry criteria including educational and experience levels to the professional levels within the IT industry.
  - Create a Value Statement for the IT Profession which is recognised by all Key stakeholders.
- The IT Industry
  - IT Industry should fully participate in the creation of a Value Statement for IT Professionals and take actions to promote the profession within its own company and with customers.
- The State and regulatory bodies
  - The State should take a Leadership role in endorsing membership of a professional Computer Society
- Academic Institutions
  - Academic Institutions can help strengthen the IT profession by including in their curriculum subjects relating to the core value of the IT profession and on the meaning and value of professionalism.
- IT Professionals
  - IT practitioners must take an active part in establishing the value of an IT Professional organisation and use their position within the industry to live and promote its values.

The concept of market forces is also discussed in relation to the recommendations leading to the concept of social closure as described in Larson's Professional Project (Larson 1977).

I then took a reflective look at the project from a professional and methodology view point and discussed the project's contribution to knowledge and the IT profession.

The project introduces a model of professional which is tailored specifically for the IT profession. It does this by taking a holistic view of the problem, analysing research conducted on professionalism in general and specifically in relation to the IT profession. It then analyses the current implementation of this professional model across various countries in Europe and comes up with key findings from this study. These findings are then translated into recommendations for the key stake holders of IT professionalism.

The findings and recommendations represent a significant contribution to the structure and workings of the IT profession in Europe. Its outcome will contribute to the enhanced standing of the IT profession which in turn will make it a more attractive profession for students to join and professionals to thrive. It is understood to be the first time such a study of IT professionalism has been conducted on a European level.

While this research makes a significant contribution to our understanding of how IT professionalism is implemented across Europe and suggests recommendations to strengthen its implementation, it also offers opportunities for further research in this area. One particular area of research that I think is interesting and worthwhile is the investigation of the cultural impacts of IT professionalism. My research was conducted in English and from a Western Europe perspective. During the analysis of the data I received there were some marked differences in the answers to the questions and hence the level of maturity of the IT profession in different countries. A more thorough understanding of the cultural environment within which IT practitioners and Computer Societies operate as well as the cultural effect of interacting with the different societies and State bodies would be an interesting angle on this research.

I believe we are on the start of a journey to improve the level of IT professionalism. The signs are there that there is a need and that the timing is right. Many Computer Societies (and companies) have already made very good progress, we need to capitalise on the work already done and move forward. The output from this research will be shared with CEPIS to help it develop the IT profession at a European level.

Finally, my role as a worker/researcher has contributed to the success of this project. My knowledge and understanding of IT practitioners and the challenges facing the IT

industry across Europe has given me a good perspective on the problem to be addressed and the recommendations needed to improve the level of IT professionalism.
The combination of my experience and research ability has combined to make this a very enjoyable, productive and worth-while experience.

We are still in the formative years of the IT profession and I believe this project has made a significant contribution on that journey.

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Appendix I : Pilot Survey Feedback

September 2006

Dear Computer Society,

My name is Sean Brady, I am an executive in IBM's European organisation (based in Ireland) but my reason for contacting you is in relation to a Doctorate in Professional Studies I am pursuing at Middlesex University, UK.

I am completing my final part of this programme and my project is in 'Professionalising the IT Industry: Towards the Creation of a Professional Association'. My objective is to make a contribution to the industry by analysing what it means to be a professional organisation, examining the progress in Europe to-date and suggesting the next steps towards strengthening the professional status of IT.

I would appreciate it very much if you could take a few minutes to complete this short survey and return to me (Sean_Brady@ie.ibm.com) by September 30th, 2006.

The results of the survey will be shared with the CEPIS, the Council of European Professional Informatics Societies.

In addition, if you have other information on IT Professionalism you would like to share, please send to me at the above email address.

Thank You

Sean Brady

Survey Objectives

The objective of this survey is to gather information regarding the status of professionalism in the IT industry as implemented by European Computer Societies.

The results of this survey will contribute to the continued advancement of professionalism within the IT Industry.

Please complete the short questionnaire below and return to **Sean_Brady@ie.ibm.com**.

Thank you very much in advance.

Background Information

Name of Computer Society : Irish Computer Society
Survey Completed by : Declan Brady
Position in Society :President

Question 1:

On a scale of 0-10, how well defined are the members of your Computer Society ?

Comment: What do you mean here? Some societies have membership grades (which would be clearly defined, but would not correspond with IT job roles), whereas others do not. Some societies will attempt to record data about a persons professional role, but others do not. I think you may not be asking the right question here?

0=Undefined	5=Partially	10=Very well defined
Members generally employed in IT. No specific categories of roles defined.	Members employed in the IT industry. Broad categories of Job roles defined, e.g. Software Engineer, IT Architect, Technical Support	Clear roles and responsibilities of members. Clear job, process and task definition for all members in society.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 2:

On a scale of 0-10, how well defined is the relationship your members have with other professions ?

Comment: This would be anecdotal, at best. Perhaps better to ask how well defined the relationship is between the society and other professional sofieties?

0=Undefined	5=Partially	10=Very well defined
Unclear relationship between members and	General agreement and understanding of	Clarity of responsibilities and demarcation between IT

other professionals, e.g. Engineers, Accountants, etc.	roles. No formal agreement or understanding in place.	Professionals and other Professions. For example agreement/understanding in place.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 3:

On a scale of 0-10, how well defined is the level of knowledge required to be a member of your profession?

0=Undefined	5=Partially	10=Very well defined
No specific educational requirements required.	Educational standards defined perhaps with experience alternative. Often alternative educational standards accepted (e.g. non-IT related degrees)	Knowledge required is specified and controlled by the profession. Strict adherence to educational standards required

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 4:

On a scale of 0-10, how controlled is entry to your profession?

0=Weak	5=Partially	10=Strong
No controls, general access to profession once basic criteria met.	Entrants partially controlled, maybe in terms of standards or numbers	Entrants tightly controlled. Profession controls entry standards (e.g. entrance exams) and number of new entrants to the profession

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 5:

On a scale of 0-10, what is your society's level of relationship with academic institutions?

0=Weak	5=Partial	10=Very Strong
No Influence on Academic Curriculum	Partial Influence. Seeks to advise and guide and partially successful in contributing to IT curricula.	Strong influence on and participation in academic curricula in Universities.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 6:

On a scale of 0-10, what is your society's level of recognition within industry?

0=None	5=Partially	10=Very well recognised
Companies are not aware of professional recognition for IT professionals	Companies are aware of the profession, but do not make it a pre-requisite or requirement to practice.	Companies fully recognise status of members and as a pre-requisite to practice must be members of your profession.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 7:

On a scale of 0-10, what is the degree of monopoly your profession enjoys?

0=None	5=Partially	10=Strong
None. Ability to practice IT does not	Partial. Only members of your profession have certain	Profession holds monopoly status. Practitioners must be

require membership of profession.	privileges but membership is not required to practice.	members of your profession to practice.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 8:

On a scale of 0-10, what is the level of Licensing required to practice IT in your country?

0=Weak	5=Partially	10=Strong
No, not required	Partial, in some circumstances	Yes, mandatory.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 9:

On a scale of 0-10, What is your level of influence on State/Government and public policy in areas affecting your profession?

0=Weak	5=Partially	10=Strong
None	Partial, in consultative mode only. Limited success in affecting policy.	Strong, always consulted and strong enough to influence changes

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 10:

On a scale of 0-10, To what degree is your profession self regulatory?

0=Weak	5=Partially	10=Strong
Not at all. No self regulatory mechanism in	Partially. Ability to affect membership of profession, but	Fully self regulated, with ability to revoke

place or not/infrequently used.	not licence to practice. Used with moderate frequency.	licence to practice. Frequently used.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

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Question 11:

On a scale of 0-10 How well do you regulate your code of ethics?

0=Weak	5=Partially	10=Strong
Never, do not have a code of Ethics.	Code of Ethics defined, but no/little support to members and customers.	Strong code of ethics defined with support to members and customers

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

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Question 12:

On a scale of 0-10, How clear is your core value definition understood by customers?

Comment: I think you will need to explain what you mean by "core value definition" and also clarify what you mean by "customers".

0=Weak	5=Partially	10=Strong
Unclear understanding of core value definition of profession by customers.	Multiple and often conflicting value definitions of profession understood by customers.	Strong clarity of core value provided by members

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

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Question 13:

On a scale of 0-10, What is the perceived level of trust and responsibility of your profession by customers and society?

0=Weak	5=Partially	10=Strong
Poor, seen as potentially mis-trustful and irresponsible. Numerous examples of such exist in society.	Mixed views, maybe no direct negative experience but general media perception.	High, seen as ethical and fully trustworthy, 'pillars of society'.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 14:

On a scale of 0-10, What level of career path do you provide for your members?

Comment: Again, clarify: presumably you mean models of career paths?

0=Weak	5=Partially	10=Strong
None, no focus on developing member's careers.	Partially, advice and guidance but not actively promoted or encouraged.	Strong, clearly defined career path with requirement and standards defined at each stage.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 15:

On a scale of 0-10, What level of support do you give your members on professional matters (e.g. ethical, knowledge related, legal or client related)?

0=Weak	5=Partially	10=Strong
None or very little. Service is not provided to members.	Partial, advice and guidance on request / ad-hoc basis only.	High, office in place to support members on all aspects of professional activity.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 16:

On a scale of 0-10, What level of support / resources does your organisation have to promote and encourage continuous learning amongst its members?

0=Weak	5=Partially	10=Stong
No programme in place	Available on information only basis. No mechanism to ensure members maintain currency of skills.	Strong formal programme in place to ensure members up-to-date on current topics. Re-certification required to ensure currency of knowledge and skills.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Thank You !

Please return the completed surveys to Sean_Brady@ie.ibm.com

Appendix II : Final Survey

Dear Computer Society,

My name is Sean Brady, I am an executive in IBM's European organisation (based in Ireland) but my reason for contacting you is in relation to a Doctorate in Professional Studies I am pursuing at Middlesex University, UK.

I am completing my final part of this programme and my project is in 'Professionalising the IT Industry: Towards the Creation of a Professional Association'. My objective is to make a contribution to the industry by analysing what it means to be a professional organisation, examining the progress in Europe to-date and suggesting the next steps towards strengthening the professional status of IT.

I would appreciate it very much if you could take a few minutes to complete this short survey and return to me (Sean_Brady@ie.ibm.com).

The results of the survey will be shared with the CEPIS, the Council of European Professional Informatics Societies.

In addition, if you have questions relating to the survey or other information on IT Professionalism you would like to share, please send to me at the above email address.

Thank You

Sean Brady

Survey Objectives

The objective of this survey is to gather information regarding the status of professionalism in the IT industry as implemented by European Computer Societies.

The results of this survey will contribute to the continued advancement of professionalism within the IT Industry.

Please complete the short questionnaire below and return to **Sean_Brady@ie.ibm.com**.

Thank you very much in advance.

Background Information

Name of Computer Society:
Survey Completed by:
Position in Society:

Question 1:

On a scale of 0-10, how well defined is the scope or jurisdiction of your Computer Society?

0=Weak	5=Partially	10=Very well defined
Scope is people generally working in IT	Scope is defined as specific job roles within the IT industry e.g. Software Engineer, IT Architect, Technical Support, etc.	Scope is defined as only certain job roles, processes and tasks within the IT Industry. There is clarity as to what roles are in or out of the scope of your Society.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 2:

On a scale of 0-10, how well defined is the relationship your society has with other professional societies?

0=Undefined	5=Partially	10=Very well defined
Unclear relationship between members and other professionals organisations, e.g. Engineers, Accountants, etc.	General agreement and understanding of roles. No formal agreement or understanding in place.	Clarity of responsibilities and demarcation between IT Professionals and other Professional organisations, for example agreement/understanding in place.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 3:

On a scale of 0-10, how well defined is the level of knowledge required to be a member of your profession?

0=Undefined	5=Partially	10=Very well defined
No specific educational requirements required.	Educational standards defined perhaps with experience alternative. Often alternative educational standards accepted (e.g. non-IT related degrees)	Knowledge required is specified and controlled by the profession. Strict adherence to educational standards required

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 4:

On a scale of 0-10, how controlled is entry to your profession?

0=Weak	5=Partially	10=Strong

No controls, general access to profession once basic criteria met.	Entrants partially controlled, maybe in terms of standards or numbers	Entrants tightly controlled. Profession controls entry standards (e.g. entrance exams) and number of new entrants to the profession

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 5:

On a scale of 0-10, what is your society's level of relationship with academic institutions?

0=Weak	5=Partial	10=Very Strong
No Influence on Academic Curriculum	Partial Influence. Seeks to advise and guide and partially successful in contributing to IT curricula.	Strong influence on and participation in academic curricula in Universities.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 6:

On a scale of 0-10, what is your society's level of recognition within industry?

0=None	5=Partially	10=Very well recognised
Companies are not aware of professional recognition for IT	Companies are aware of the profession, but do not make it a pre-requisite or	Companies fully recognise status of members and as a pre-requisite to practice must

professionals	requirement to practice.	be members of your profession.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 7:

On a scale of 0-10, what is the degree of monopoly your profession enjoys?

0=None	5=Partially	10=Strong
None. Ability to practice IT does not require membership of profession.	Partial. Only members of your profession have certain privileges but membership is not required to practice.	Profession holds monopoly status. Practitioners must be members of your profession to practice.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 8:

On a scale of 0-10, what is the level of Licensing required to practice IT in your country?

0=Weak	5=Partially	10=Strong
No, not required	Partial, in some circumstances	Yes, mandatory.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 9:

On a scale of 0-10, what is your level of influence on State/Government and public policy in areas affecting your profession?

0=Weak	5=Partially	10=Strong
None	Partial, in consultative mode only. Limited success in affecting policy.	Strong, always consulted and strong enough to influence changes

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 10:

On a scale of 0-10, to what degree is your profession self regulatory?

0=Weak	5=Partially	10=Strong
Not at all. No self regulatory mechanism in place or not/infrequently used.	Partially. Ability to affect membership of profession, but not licence to practice. Used with moderate frequency.	Fully self regulated, with ability to revoke licence to practice. Frequently used.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10

Answer											

Question 11:

On a scale of 0-10 how well do you regulate your code of ethics?

0=Weak	5=Partially	10=Strong
Never, do not have a code of Ethics.	Code of Ethics defined, but no/little support to members and customers.	Strong code of ethics defined with support to members and customers

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 12:

Consider the table below giving examples of the core value of other professional bodies:

Profession	Core Values
Clergy	Holiness, spiritual healing, confidentiality, high morals
Medical	Health protection and healing, ethical oath
Accountants	Ethical, independent auditors, financial management
Architect	Design innovation
Police	Protection of life and property
Lawyers	Administration of Law and order, administration of justice
Engineers	Design and build

Question 12a) What do you consider the core value of members of your Computer Society is?

Answer 12a): _____

Question 12b) On a scale of 0-10, how well is this core value understood by industry and society?

0=Weak	5=Partially	10=Strong
Unclear understanding of core value of members of Computer Society.	Multiple and often conflicting core values of members of your Computer Society understood by industry and society.	Your Society's core value is clearly understood by industry and society.

Answer 12b (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 13:

On a scale of 0-10, what is the perceived level of trust and responsibility of your profession by customers and society?

0=Weak	5=Partially	10=Strong
Poor, seen as potentially mis-trustful and irresponsible. Numerous examples of such exist in society.	Mixed views, maybe no direct negative experience but general media perception.	High, seen as ethical and fully trustworthy, 'pillars of society'.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 14:

On a scale of 0-10, what level of career path models do you provide for your members?

0=Weak	5=Partially	10=Strong
None, no focus on developing member's careers.	Partially, advice and guidance but not actively promoted or encouraged.	Strong, clearly defined career paths with requirements and standards defined at each stage.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 15:

On a scale of 0-10, what level of support do you give your members on professional matters (e.g. ethical, knowledge related, legal or client related)?

0=Weak	5=Partially	10=Strong
None or very little. Service is not provided to members.	Partial, advice and guidance on request / ad-hoc basis only.	High, office in place to support members on all aspects of professional activity.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Question 16:

On a scale of 0-10, What level of support / resources does your organisation have to promote and encourage continuous learning amongst its members?

0=Weak	5=Partially	10=Strong
No programme in place	Available on information only basis. No mechanism to ensure members maintain currency of skills.	Strong formal programme in place to ensure members up-to-date on current topics. Re-certification required to ensure currency of knowledge and

		skills.

Answer (Place an X in one of the boxes below):

Scale	0	1	2	3	4	5	6	7	8	9	10
Answer											

Thank You !

Please return the completed surveys to Sean_Brady@ie.ibm.com